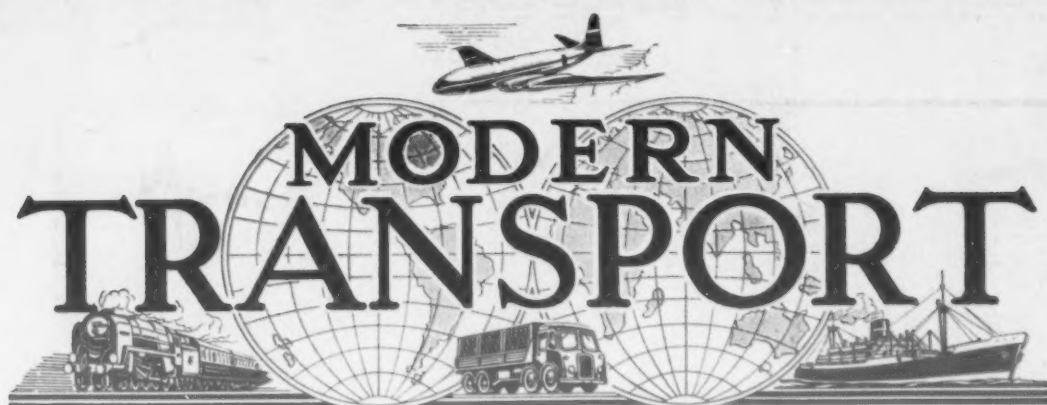


TRADE AND TRANSPORT OVERSEAS

Special
Articles



Enlarged
Issue

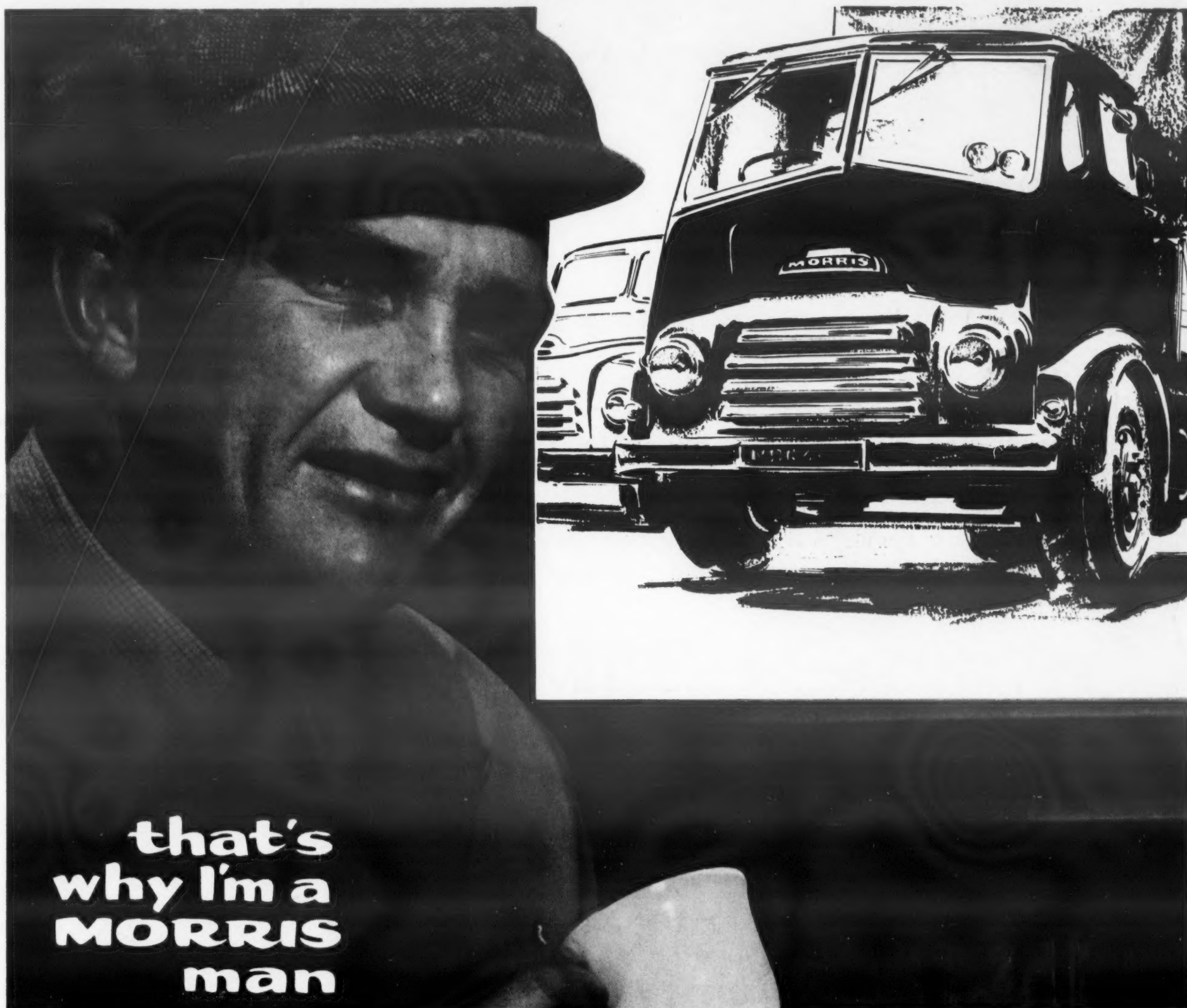
"THE TIMES" OF THE TRANSPORT WORLD

VOL. LXXIX No. 2033

[Registered at the G.P.O.]
as a newspaper

LONDON, MARCH 15, 1958

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REEF
SUBURBAN
ELECTRIC
STOCK

See Page 3



"THE TIMES" OF THE TRANSPORT WORLD

BUS
OPERATION
IN WEST
PAKISTAN

See Page 12

VOL. LXXIX No. 2033

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PRICE NINEPENCE

M.o.T. Road Transport Survey

SOME really illuminating evidence on the use made of our road transport resources ought to be forthcoming from the sample investigation of goods vehicle usage which the Minister of Transport is to carry out in the seven days beginning April 21. In some respects the previous inquiry, held in September, 1952 (a report of the findings was summarised in our May 8, 1954, issue) produced a frustrating document, certainly one which generated much heat without commensurate light in some quarters. All sorts of false comparisons were drawn between the alleged efficiencies of British Road Services, private hauliers, and ancillary users. This time private and state haulage at least will be on an equal footing and efforts should be made to see that returns are made on a strictly comparable basis. Operators of the 8,000 selected vehicles will, as before, be requested to indicate on the prescribed form the nature of goods carried, maximum load during each journey, miles run loaded over or under half vehicle capacity, and empty mileage, also the starting and finishing points. In 1952, private hauliers were labouring under the 25-mile radius restriction but C-licensed transport was still expanding strongly. Since then there has been a further increase of at least 200,000 vehicles in its potential. Six years ago road transport was providing nearly as great a ton-mileage as the railways—the originating tonnage was estimated at three times that of the railways—and C-licensed vehicles were said to be hauling slightly more than half the road traffic going over forty miles. One of the things it may now be possible to determine is whether traders have since then succumbed to the blandishments of very much more competitive hauliers or whether they have still further turned over to their own transport. Our guess is the latter.

Railway and Community in Canada

IF Canadian railways were to meet competition, there could be no substitute for progress, said Mr. Douglas V. Gonder, vice-president and general manager of the Atlantic region of Canadian national railways, at the annual meeting of the Truro Board of Trade. Cutting costs through technological advancement and modernisation of operating methods was the answer to soaring wages and material prices, he said. That progress was not confined to the railways but applied to firms and communities throughout the country. Canadian National, he emphasised, believing in "fair and healthy competition as a stimulus to effort," was keeping well abreast of the field in transportation through its modernisation programme. He pointed out that the railways must maintain their own roadbeds, terminals and other facilities, calling for heavy outlays which their principal competitors were not required to make, while rail earnings were limited by legislation. Ever-increasing efficiency in operating was seen as the obvious step in this situation. That technological progress had in some respects altered the relationship between the railway and some communities.

Commonwealth Railway Reports

WHO outside the country of origin digests the annual reports of Commonwealth railway undertakings? It must be said that some of those which month by month thud through our letterbox are not the most absorbing of documents; rather are they voluminous testimonies to the minutiae of railway operation, with little to recommend them to those not concerned with detailed statistical variations. Thumbing patiently through their eminently respectable pages one is confronted with an endless array of facts and figures, many of which on closer examination turn out to be last year's rehashed and brought more up to date. The scope of these annual compositions is prodigious; drought reports follow hard on recent locomotive deliveries; bedding, book-stalls and bakeries jostle breathlessly for space lest any title should go unrecorded, any achievement be denied its due recognition. The table of contents does not always live up

to its name and an index is not invariably proffered. Chapter headings have a habit of losing themselves in a welter of lesser subdivisions given equal prominence. Of course there are honourable, even distinguished exceptions to this catalogue of criticisms; moreover it is realised that such reports must follow an outline prescribed by statute. But must the contents be quite so stereotyped—and their arrival so tardy? Even if the subject matter must be substantially repeated there is nothing to debar a prefacing summary, clearly indicating financial results and principal developments in the various departments of operation. Railways which neglect this annual and possibly sole opportunity to

1957. During the year 67 per cent of the train mileage was covered by electric and 31 per cent by diesel-electric trains. Additions to the passenger rolling stock included 13 trailer carriages, 31 two-coach electric units and three four-coach diesel-electric sets for the Trans Europ Express (T.E.E.) trains. The number of passenger seats increased from 106,191 to 112,318.

Cross-Country Diesel Railcars

BUILT at the Western Region Swindon Works, new three-car cross-country diesel railcar trains, providing accommodation for 18 first-class and 148 second-

which includes several articulated units. Entrance gates are operated pneumatically and are provided with forced warm air curtains to prevent heat losses and draughts in the building. Automatic drive-through bus washers, developed by the Zürich undertaking, are set in motion by floor treadles and can clean the sides of a vehicle in 50 sec. There is also a separate high-pressure chassis washing bay. The new depot, of which the main building possesses a virtually unobstructed parking area of 295 ft. by 315 ft., has no inspection pits, as it is believed that underfloor work can be more readily carried out with the bus standing on a lift. Main bus overhauls of Zürich Transport will continue to be in its Oerlikon central workshops.

A.T.C. in Perspective

AN adjournment debate in the House of Commons on March 7 enabled the Joint Parliamentary Secretary to the Ministry of Transport to put in proper perspective the case for automatic train control. He was replying to Mr. Philip Goodhart, Member for Beckenham, some of whose constituents were killed in the Lewisham disaster, and who alleged delay in the installation of a.t.c. Quite rightly Mr. Nugent refrained from dealing with a.t.c. in isolation, linking it with track circuiting and colour light signalling, each a valuable safety device in itself and capable of eventual combination to give maximum traffic safety. Colour light signals operating in the Lewisham area, he said, had had an accident-free record for nearly 30 years. The a.t.c. system now adopted by the B.T.C. was an advance on the G.W. and Hudd systems, and seven and a half years was not an unreasonable time to occupy in perfecting it. Capital restrictions were not slowing up the a.t.c. programme, which was indeed being accelerated in association with the other safety devices. In the last 46 years 1,599 people had been killed in railway accidents, a figure equivalent to four months' road fatalities. This he regarded as a wonderful record. Of the rail accidents concerned about 11 per cent could probably have been avoided, and roughly 31 per cent of the fatalities, if a.t.c. of the warning type had been fitted.

Ceylon Bus Excitements

EXCITEMENT persists in clinging to every phase of the Ceylon bus situation; the nationalised Ceylon Transport Board has been so violently criticised since January 1, when it began operations, that the chairman, Mr. Vere de Mel, resigned after a sharp attack in Parliament. He was, however, persuaded by the Premier and the Minister of Transport and Works to resume office within a few hours. The Board seems to have incurred disfavour because, although the members were appointed about nine months ago, it appears to the public that they had made insufficient preparation for the takeover at the beginning of the year. It will, however, be recalled that we emphasised in these columns that difficulties seemed bound to arise if the Government insisted on the C.T.B. taking over all the island's fleet at once, rather than the carefully phased takeover outlined by Mr. L. C. Hawkins. Within days 500 vehicles were found to be unserviceable out of 3,000 in the fleet, and the Board had to suggest to bus travellers that they should use alternative means of transport—i.e. the railways—if possible. The salaries and wages paid have also been the subject of attack. The 3,000 buses are of 35 makes and of 100 types. Spares have been purchased and orders placed for more, but the number of classes must be reduced. New vehicles ordered include Albion, Austin, Leyland and Morris units from Britain, and we have already reported 60 double-deckers from London Transport. To overcome vehicle shortage the C.T.B. has asked the Commissioner of Motor Traffic for permission to overload buses 100 per cent, and although no authority has been given, a blind eye is apparently turned to overcrowding for the time being.

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project themselves into public notice in Britain have only themselves to blame if their special problems receive less than due consideration in manufacturing, financial, economic and political circles here.

Netherlands Railways in 1957

FOR the first time since 1950, there was no further increase in 1957 in the number of passengers carried by the Netherlands Railways. The total number of passenger-kilometres is expected to be approximately equal to that in 1956 (7,687 million). The volume of goods transported is estimated to be about 5 per cent lower than in 1956 (3,562 million ton-kilometres), mainly due to a decrease in coal transport. Other goods traffic maintained the 1956 level. As a result of the increase in fares introduced on April 1, 1957, revenue from passenger transport rose by about 5 per cent, and that from goods traffic by 2 per cent, in comparison with 1956. The increase in revenue was, however, exceeded by a further rise in operating cost and higher write-offs. During 1957, three sections were electrified. By the end of the year, the system had a length of 3,223 km. (1,934 miles), of which 1,583 km. (950 miles), or 49.1 per cent, was electrified. The number of locomotives was increased by 69 diesel-electric main-line locomotives and three diesel-electric shunters, the total number of diesel-electrics thus being brought up to 440. The last steam locomotive has come out of service and 107 were scrapped in

class passengers, went into service on March 10. The centre vehicle is a trailer and contains a small buffet, with collapsible tables adjacent to each passenger seat. Access to the buffet is possible from all the cars. Plastics panelling above and at the sides of the buffet counter is in medium Australian walnut design. The buffet is equipped with a propane-fired hot water boiler and an electric refrigerator. Sink, storage cupboards, display case and shelves are also provided, the shelves being all finished with light-coloured plastics. An electric extractor fan is fitted in the roof of the buffet. The power cars are equipped with two 150-h.p. horizontal six-cylinder A.E.C. engines, supplied with control and transmission equipment by British United Traction. The new diesel sets replace steam trains between Cardiff and Bristol and between Birmingham and South Wales stations on five services. In addition, they replace existing Birmingham—South Wales intercity diesel cars on four trips.

Largest Swiss Bus Garage Opens

COMPLETED at a cost of £850,000, a new bus and trolleybus garage, the largest and most modern in Switzerland, was opened by the Zürich municipal transport undertaking in Zürich-Seebach a few weeks ago. The garage can accommodate 120 of the 200 vehicles now in service in Zürich and incorporates many features for rapid servicing and cleaning of the bus fleet,

A tough 14-17 tonner for overseas



A.E.C. BONNETED 'MAMMOTH'

Built for hard going and big mileages, the Bonneted 'Mammoth'—one of the heavies of the A.E.C. range—has all the power and stamina needed for overseas operation. It has a big 150 b.h.p. 6-cyl. diesel engine, 6-speed overdrive gearbox and heavy duty rear axle—all designed to stand up to heavy work, long and arduous hauls day in and day out. A large capacity radiator with oil cooler and extra large fuel tanks combat high temperatures and big distances between refuelling points. Like all A.E.C.'s, inherently dependable however hard it is driven, the overseas Bonneted 'Mammoth' is available in a wide variety of specifications to suit every type of load and service—and with right- or left-hand drive.

Other load carriers in the A.E.C. overseas range include:

'MONARCH' VI
2-axle 112 b.h.p. 12-tonner.

'MANDATOR'
2-axle 165 b.h.p. 14-tonner.

BONNETED
'MAMMOTH MAJOR' 6
3-axle 165 b.h.p. 24-tonner.

'MAMMOTH MAJOR'
3-axle 165 b.h.p. 24-tonner.

'MAMMOTH MAJOR'
4-axle 165 b.h.p. 28-tonner.

* 13 ft. and 18 ft. wheelbases.
8 ft. overall width.

* A.E.C. 11.3 litre, direct-injection
diesel engine.

* 6-speed overdrive main gearbox
and/or step down auxiliary
gearbox.

* Gross train weight of 80,000 lbs.



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The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements. In controversial subjects relating to all aspects of transport and traffic this newspaper offers a platform for independent comment and debate, its object being to encourage the provision of all forms of transport in the best interests of the community.

Relations in Industry

GREAT BRITAIN was the first country in the world to have an industrial revolution, and this has long since given way to a process of evolution which will continue into the foreseeable future. In reminding his audience of this Mr. D. M. Sinclair, general manager of the Birmingham and Midland Motor Omnibus Co., Limited, in his paper to the Institute of Transport on March 10, stressed the importance of good staff relations in industry and of ensuring that all concerned realised its implications in the national economy. The advent of railways and their encouragement of industrial development impelled legislation in the shape of the Factory Acts of the first half of the 19th century. These gave to the workers some much-needed protection, which was extended as trades unionism gained ground. It was the incidence of the 1914-18 war that secured union "recognition" from the employers; hitherto railway managers, for instance, had had little to do with union leaders. The year 1916 saw the birth of the Whitley Committee, envisaging a new system of friendly negotiation and consultation through joint industrial councils representative of management and workers, with the creation later of the Industrial Court. However, the hard postwar economic conditions of the 1920s led to the embitterment of industrial relations, with its climax in the General Strike of 1926. Some say that this cleared the air. Thereafter there was some betterment and the 1939-45 war once again brought closer association between State and unions. Relations with the employers improved and there came evidence of an increasing desire to reach agreement without involving stoppages of work. Indeed, one began to perceive the possibility that strikes and lockouts would become outmoded.

Labour in Transport

BUT recent times, as Mr. Sinclair pointed out, appear to have brought a change of atmosphere. "There is," he said, "danger of returning to the conditions of the jungle and of jeopardising the many liberties which have been so hardly won." For this situation politicians, employers and unions must share the blame; meanwhile one overriding fact cannot be ignored—that there is a limit to what industry can afford, that wages are dependent upon productive efficiency. In this context the author drew attention to the peculiar problems of the transport industry. The task of increasing the rate of production in manufacturing processes, he said, is relatively easy compared with that of achieving an increased production in transport, even assuming in both cases utmost co-operation from the unions. A manufacturer faces competition only from those who make the same kind of article, but public transport has to contend with a diversity of private transport in the shape of cars, motor cycles, scooters and cycles, and even with "Shanks's pony." And the more private transport the greater the handicaps to public transport arising out of street congestion. Moreover transport is ephemeral and cannot be stored—vacant seats are a dead loss. And there are also exceptional labour difficulties. Taking the bus industry, Mr. Sinclair pointed to the frequent strong union resistance to more economical scheduling, to proposals to increase vehicle carrying capacity and to the introduction of one-man operation. "On more than one occasion," he said, "when reaching agreement with employers on a wage claim and improved conditions, the unions have undertaken to co-operate in measures designed to achieve greater efficiency and economy in operation, but there have been few signs that these undertakings have been really sincere; if they have, then the union leaders appear not to have been able to carry their members with them. If the unions are not willing to have regard to the ability to pay and are lukewarm in co-operating to achieve economies where these are obviously possible, where is their solution to the problem of ensuring that public transport will at least pay its way while providing a good living for those engaged in its operation?"

MODERN TRANSPORT MARCH 15, 1958

Agreements and Sanctions

WHAT action, he asked, had the unions taken against the promoters of unofficial strikes? Sanctions were readily applied against those who did not answer the call to strike, but there was little evidence of sanctions against those who disobeyed union instructions not to strike. Whilst employers were expected to refrain from victimisation there was no hesitation by their employees to "send to Coventry" comrades who had chosen not to participate in a strike, an objectionable practice which union leaders rarely, if ever, condemned. Strikes should of course be regarded as anathema, and the author appealed to industrial and trade union leaders to get together and work out peaceful means of resolving differences. He deprecated the practice of the unions in demanding about twice what they were prepared to accept and of the employers in offering half what they intended to concede; small wonder that arbitration tribunals were able to get so many disputes settled merely by "splitting the difference" and giving no reason for their decisions. Agreements reached without going to arbitration were sometimes rejected by the rank and file—a plain call for more determined leadership—though the author said he could not recall in recent years any such agreements being repudiated by the employers. "I suggest to my trade union friends," he said, "that it would be in their best interests to devote much of their time to the creation amongst their members of a real sense of discipline." He felt there was little hope of creating a better kind of relationship in industry unless those responsible possessed a faith in the future of the country and were willing to strike for the prosperity of all; it would be achieved not by conducting a war for or against higher wages but only by united action to meet the dangers of increasing foreign competition.

Need for Unity

THIS unity, he urged, should replace the conception underlying the expression "both sides of industry." Joint councils, which had done much useful work in the past, were apt to encourage sectional interests "on both sides of the table" rather than the general interests of the industry concerned; round tables should replace rectangular ones in the council chamber and the members' seats be mixed up accordingly. A more constructive attitude was needed. Instead of making claims on one another both sides should combine, at regular meetings, to consider the general state of the industry and what contribution all could make towards improving its efficiency and thus promoting a greater measure of prosperity for all whose livelihood depended upon it. If times were prosperous the workers would automatically benefit, but if times were bad some sacrifice from all would be called for and accepted. "And if, because of some extraneous circumstance, an increase in the earnings of those who depended upon the industry... was agreed to be necessary, then it would be the bounden duty of all members of the council to seek, and agree in principle, methods of achieving greater efficiency and economy to enable such increased earnings to be paid." Disagreement would if necessary be solved by independent arbitration and on the understanding that the decision would be accepted without question; tribunals also would be required to give detailed reasons for their findings. Mr. Sinclair's proposals may seem idealistic, but they are surely well-founded, and he is to be congratulated on having the courage to ventilate so many home-truths. He does not expect his views to be accepted within the next year or two, but he is anxious they should figure in the continuing process of evolution which he perceives in industrial relations. One hopes that such ideas as his will prevail, for nothing can be gained by fostering suspicions and enmities which, though common some 50 years ago, are no longer justified as tenets of the welfare state. The discussion following the reading of the paper emphasised interest in the subject, with a reminder of the existence of a third party—the public—as a claimant in arbitration and of the need for encouraging responsible and dependable workers to participate in union branch meetings whose venue might usefully be the factory floor. But one was left wondering what steps can be taken to attract attention to such ideas and to implement those of the author, who rightly stressed their urgency.

Forthcoming Events

Until March 23.—International Motor Show at Geneva.
March 18.—Institute of Transport (Humbly Grove). Paper by Mr. H. Leslie Bowes, "Maritime Miscellany." At Chamber of Commerce and Shipping, Hull. 7.30 p.m.
Institute of Transport (Swindon). Paper by Major P. W. H. Jay, "The Development of Air Supply." At Town Hall, Swindon. 7.45 p.m.
Industrial Transport Association (London). Annual general meeting. At Caxton Hall, S.W.1. 6.30 p.m.
Permanent Way Institution (York). Paper by Mr. H. W. Clarke, "Problems of Yard Maintenance." At Railway Institute, York. 6.45 p.m.
March 19.—Institute of Transport. Visual Aids Meeting. Films "Link Span" and "Cutting the Queue." At 80 Portland Place, W.1. 6.15 p.m.
Institute of Transport (Beds, Cambs and Hunts). Paper by Mr. J. E. Harper, "Helicopters." At Town Hall, Luton. 6.45 p.m.
Institution of Locomotive Engineers. Annual general meeting. Paper by Messrs. H. A. Gill and J. M. Smith, "Fuel and Injection Equipment for Traction Diesel Engines." At Institution of Mechanical Engineers, 1 Birdcage Walk, S.W.1. 5.30 p.m.
Permanent Way Institution. Paper by Mr. J. Kell, "Modern Trends in Tunnelling Practice." At 222 Marylebone Road, N.W.1. 6.30 p.m.
Royal Society of Arts. Trueman Wood Lecture by Sir Christopher Hinton, "Industrial Power of the Future." At John Adam Street, W.C.2. 2.30 p.m.
March 21.—Institute of Transport. Annual dinner. At Dorchester Hotel, W.1.
Institute of Transport (Tees-side). Paper by Mr. N. H. Dean, "Roads." At Cleveland Scientific and Technical Institution, Middlesbrough. 7 p.m.
Institution of Mechanical Engineers. James Clayton Lecture by Dr. E. Schmidt, "High-Speed High-Performance Diesel Engines: Their Development and Application." At 1 Birdcage Walk, S.W.1. 6 p.m.
Institute of Navigation. Paper by Mr. E. J. Dickie, "The Effective Utilisation of Airspace." At Royal Geographical Society, 1 Kensington Gore, S.W.7. 5.15 p.m.

BRITISH-BUILT MULTIPLE-UNIT STOCK

For South African Railways and Harbours

NEW SUBURBAN TRAINS FOR THE REEF

MAIN contractor for the design and manufacture of 349 electric coaches for the Reef System of the South African Railways is Metropolitan-Cammell Carriage and Wagon Co., Limited. The company commenced deliveries against this large and important export order during the last few months of 1957. Running tests were successfully completed by the end of January, 1958, and the new coaches, finished in an attractive smoke-grey livery, went into regular service at the beginning of February, 1958, as planned.

Of the total of 349 coaches, 105 are motor coaches and 244 are trailer coaches. Metro-Cammell is manufacturing 70 of the motor coaches and 123 of the trailer coaches at its Midland Works, Washwood Heath, whilst the remainder—35 motor coaches and 121 trailer coaches—have been entrusted to the Birmingham Railway Carriage and Wagon Co., Limited, Smethwick. The sub-contractor for the main electrical items of all coaches is Metropolitan-Vickers, Trafford Park, Manchester.

Accommodation

The trains are designed to run from a 3,000-volt d.c. supply from overhead wires and can be operated from the cab at either end of the train. A typical eight-coach train consists of six trailer coaches with a motor coach at each end; the main dimensions of the vehicles are tabulated. Of the

Length over body end panels ..	60 ft. 3 in.
Width over body panels ..	9 ft. 3 in.
Centres of bogies (motor coaches) ..	41 ft.
Bogie wheelbase (motor coaches) ..	9 ft.
Centres of bogies (trailer coaches) ..	44 ft. 6 in.
Bogie wheelbase (trailer coaches) ..	9 ft. 9 in.
Track gauge ..	3 ft. 6 in.

105 motor coaches, 60 have upper-class accommodation, 10 have a guard's and baggage compartment with upper-class "reserved," and 35 have a guard's and baggage compartment with third-class accommodation. The term "reserved" refers to accommodation for non-Europeans. The 244 trailer coaches are sub-divided into 178 upper class, 33 upper-class "reserved" and 33 third class. Each trailer coach has a lavatory.

The general layout of the various types of cars is shown in the diagram at the top of the page. The seating accommodation in the motor coaches is upper class 48, upper class with van, 40, and third class, 36. In the trailer coaches, 62 upper class and 60 third-class seats are provided.

Body Construction

The general construction of these cars is based on the integral tubular anti-telescopic principle, which is to consider the whole body shell as a rectangular tube with rounded corners, stiffened at intervals in its length by lateral rings formed by the crossbars, bodyside pillars and carlines. These lateral rings are maintained in position by the continuous longitudinal stiffening members such as cantrails, bodyside rails, purlins and solebars. All these members are welded at the joints with other members and also to the outer skin, the whole forming the self-supporting and load-carrying body shell.

The designs, which have been checked by calculation at every stage of their development, were carefully prepared to give lightness to the trailer cars and, commensurate with adequate strength, to carry the extremely heavy peak loads specified, together with the 200 tons end loading. It is interesting to note at this point that the trailer

which make up the main framing members to which the 14-s.w.g. panels are spot-welded. Body pillars, cantrail and cribrails are in 12 s.w.g. whilst longitudinal rails are 14 s.w.g. All framing members both vertical and horizontal are continuous and body pillars are notched as required to pass the longitudinal rails. The panels are pressed for window openings and doorways, and are automatically seam-welded before being spot-welded to the framing. Shallow top hat sections are used for the horizontal rails and modified channels for the pillars.

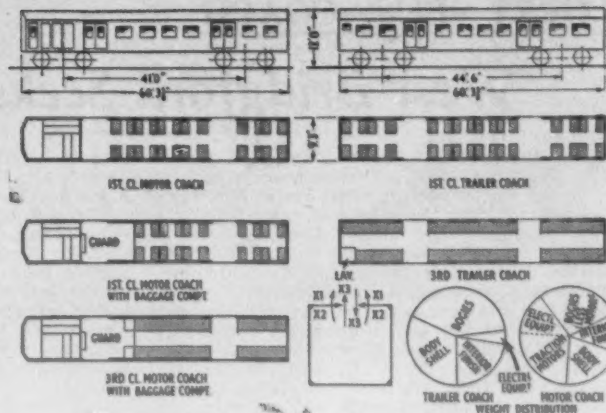
The principle of the roof construction is similar to the bodyside; the carlines, which are individual pressings from cantrail to cantrail, are notched to allow the purlins, which are V-sections, to be continuous from one end of the roof to the other. The frame members are welded to each other and stitch-welded to the roof sheets. The end framing is somewhat more rigidly constructed because of the possibility of collisions, although folded and drawn sections are still used in conjunction with 14-s.w.g. panels.

Anti-Corrosion Measures

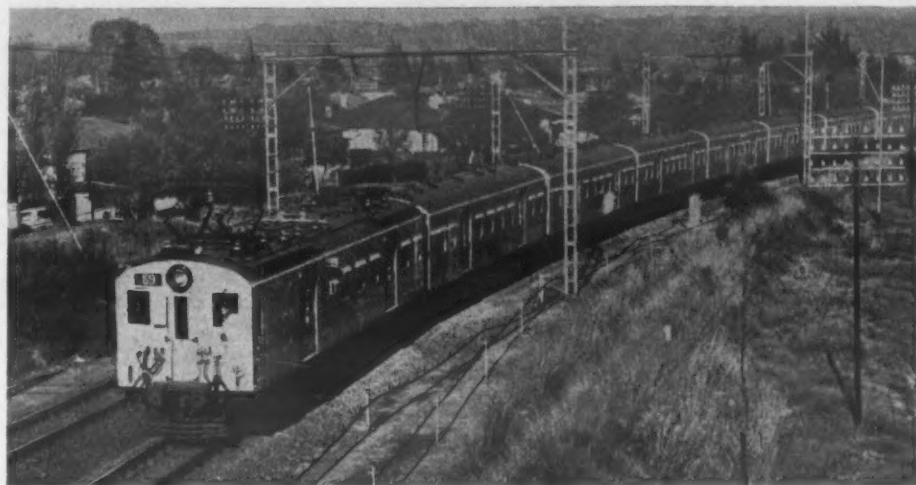
The problem of corrosion has been particularly kept in mind during the design in order to eliminate as far as possible structural conditions which

of members formed by the cant-rails, purlins, upper bodyside sheets and roof sheets; the other is situated within the lower structure below doors and windows. Vertical connections between these two main groups are formed by the pillar structures and quarter panels whose neutral axes complete the representation of the structure as a series of rectangular frames, which can be solved by mathematical analysis.

Because of the high loads to be applied to these coaches, it became obvious that the most accurate and practical method of analysis would have to be employed if all unnecessary weight was to be eliminated without endangering basic strength, and accordingly the calculations were based on the theory that the external work done by the loads deflecting the structure would equal the sum of the internal work stored in all the members. As a first step one member in each rectangular frame was assumed to be severed at its mid-point and sufficient forces introduced at that point to represent completely the function of the continuous member, as shown in the diagram. This involved



Diagrams of new Reef suburban rolling stock, showing seating, stress calculation system, and weight distribution



One of the new suburban trains for the Reef system of the South African Railways and Harbours in service with two motor coaches and six trailers; the coaches were built by Metropolitan-Cammell Carriage and Wagon Co., Limited, and have Metropolitan-Vickers electrical equipment

would be favourable to corrosion. In addition the inside of the body shell is given coats of bitumastic paint before sprayed asbestos is applied. All window pockets are lined with zinc traps with direct outlet tubes in order to deal adequately with the heavy rainfall which is experienced at times in South Africa. To assist in corrosion resistance Cor-ten steel has been used for all the structural items.

The foregoing structural description covers the trailer coaches. Motor coaches, however, are very similar above the solebars, although below this level the underframe has been strengthened to carry the many heavy items of electrical equipment.

Calculations

A careful stress analysis was conducted at every stage of the design. The complete determination of stress and deflection characteristics of any coach structure involves a number of complex problems;

three forces, X_1 , X_2 , and X_3 , capable of simulating any condition of bending, shear or direct force in the member.

The external loading was then applied to the structure, and the resulting deflections at each cut or break were equated to the component deflections induced at the same cut by unit loads applied in the position and direction of the unknown X forces. Thus a series of simultaneous equations was evolved, the unknown X forces representing the magnitude of forces introduced into the primary structure. The results obtained from using these equations proved a good guide to the behaviour of the first coach under actual strain gauge testing, when no weakness in the basic structure was found.

Vehicle Weights

As an indication of the results achieved by the design and calculations the following are the final

ings on account of standardisation. These cars have longitudinal wooden seats. Ventilation for all cars is provided by Greenwood extractor ventilators in the roof. The Wareite veneer chosen for the upper-class car panels was Stardust Buff 90. Mouldings generally are aluminium alloy to BSS.1476 H E 9 P, and are polished and self-colour anodised. The lower portion of the bodyside up to a distance of about 12 in. from the floor level is covered with stainless steel panels for added protection. In the third class the aluminium mouldings are painted. Stainless steel panels are unnecessary behind longitudinal seats.

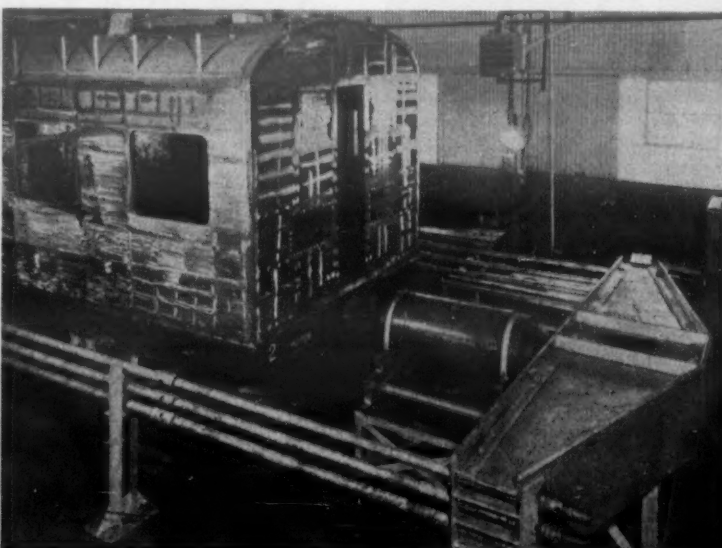
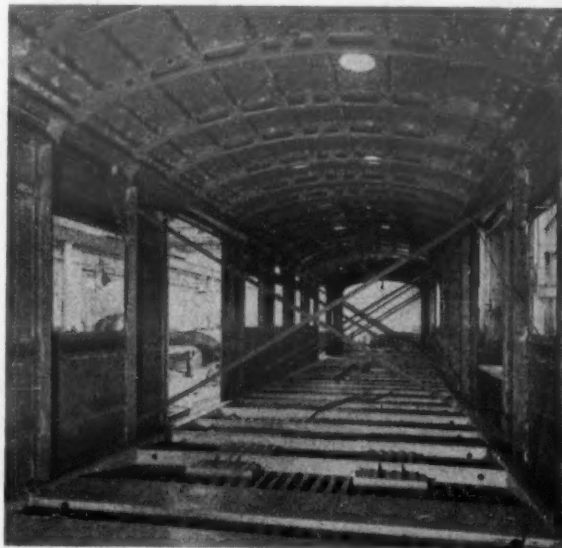
Lighting

Upper-class saloons are equipped with fluorescent tubes running centrally down the entire length of the ceiling. The translucent plastics fittings are finished in self-colour anodised aluminium. The lights operate on 110 volts d.c. supplied from the motor generator set on the underframe. Incandescent fittings are used on the same voltage for lavatories and non-passenger compartments. In the third-class saloons there are incandescent fittings, placed centrally on the ceilings. Provision has been made on all cars for the lights to be controlled if required by a photo-electric cell placed on the end finish above cantrail level. This cell is designed to switch the car lights on or off when the light inside the car falls below or rises to a predetermined level. This unit can be switched out of circuit.

Bodyside drop windows, 3 ft. in sight width, are provided on all cars, and the drop window weight is balanced by a No. 3 Hera equaliser. All windows are fitted with toughened glass sliding in felt-lined channels, and a hair cloth blind is added on all upper-class vehicles. A particular feature of the window arrangement is that the whole assembly of window, balance, guides, blind and interior finish panel below the waist is built into a self-contained window unit, which is removable inwards for maintenance purposes. It can be jig-built for interchangeability, its operation not being dependent upon the coach structure; the whole assembly has been designed so that the blind can be removed without displacing the window unit, which is provided with self-colour anodised aluminium alloy to match the remainder of the interior. Provision has been made for the simple adjustment of the Hera equaliser to balance exactly the window weight, so that the window can be left in any desired position without the use of semi-positive stops. A positive stop is, however, provided to enable the window to be locked when closed. All upper-class cars have an inclined glass vane fitted outside the window to enable it to be lowered a few inches in inclement weather.

Seats

The upper-class cars have back to back cross seats which are designed as units to be easily removable. They are built up from welded tubular frames, with foam rubber fillings, trimmed with



Suburban electric stock for the 3 ft. 6 in. gauge South African Railways: third-class trailer coach shell by Metro-Cammell; application of a 200-ton end load when testing the structure at Metro-Cammell's Midland works; and, right, taking strain-gauge readings during end-loading test

coach shell weighing just under 10 tons will support a loading of over 33 tons.

Underframes

The underframes of the trailer coaches are built up from folded or drawn section for the solebars and crossbars with a strong longitudinal troughing below the crossbars which is stitch-welded to the solebars. This troughing is 16 s.w.g. and the solebars and crossbars are respectively $\frac{1}{4}$ in. and $\frac{1}{2}$ in. The crossbars run continuously from solebar to solebar and conventional longitudinal members do not exist. A cross beam has been added between the bolster and the headstock to deal with the buffing loads from the end longitude and to distribute these loads between solebar and bolster, and thence to the troughing which is the main member dealing with buffing loads.

The headstocks are channel sections and made from $\frac{1}{4}$ -in. rolled plate. A large over-riding casting has been secured to the headstock in the centre in order to prevent the couplers from separating vertically in the event of a collision and thus minimising the risk of telescoping.

Bodysides

The bodysides are built up from drawn sections

in this particular contract such calculations were more than ever necessary in view of the exacting requirements, relating to weights and strength, imposed by the S.A.R. Most important amongst various loading conditions considered were the following:

- Vertically applied loads, due to structure, equipment and passenger weights, representing in one case a load of 33 tons.
- Horizontal loading due to traction, braking and buffing forces. In this load category all coaches had to be proved capable of withstanding a minimum of 200 tons applied at the centre coupling without damage. At end loadings, above this figure it has to be arranged that damage should first occur in the areas between bolster and headstock before any damage occurred between bolsters.

In these calculations of the basic structure all interior finish and furnishings were neglected, and the steel shell represented as a Vierendeel or rectangular framed truss simply supported at two points coinciding with the centre pivots. It has been proved by many tests undertaken by Metro-Cammell in the past that in the horizontal plane the unity of the main structure is impaired by the opening required for doors and windows, and that deflections under vertical loads take place about two horizontal neutral axes. One of these is located above windows and doors within the group

weights obtained for these S.A.R. coaches:

	Tons Cwt.
*Trailer coach (complete)	30 9
*Motor coach (complete)	60 10
Trailer bogie (complete)	6 1
Motor bogie (complete with motor) ..	14 16
*These weights do not include vacuum brake cylinders which are supplied and fitted by the South African Railways.	

A diagrammatic breakdown of the component weights and is given at the top of this page.

Interior Finish

The general interior finish of the upper-class cars is buff-coloured Wareite plastic veneered to hardboard, with self-colour anodised aluminium mouldings and fittings, whilst the ceiling is covered with a lightly patterned p.v.c. veneer. One of the main features of these coaches, therefore, is that interior painting is not necessary, and for cleaning purposes only a wipe over with a damp cloth is required. The upper-class cross seats are of the tubular type upholstered in blue.

Third-class cars, however, are finished with painted hardboard panels, although p.v.c. bonded on $\frac{1}{4}$ -in. Masonite has again been used for the ceil-

blue Vynide. A stainless steel armrest, trimmed as for the remainder of the seat, is provided at the bodyside to add to passenger comfort, but such a fitting was considered to be undesirable at the centre gangway in a suburban car, particularly at peak periods. The seats are arranged each side of the central gangway and the double seat backs carry a luggage rack constructed of aluminium alloy, polished and self-colour anodised, the main supports being castings in BSS.1490 L.M.8, and the slats extrusions in BSS.1476 H.E.10.W.P. These double seats have been designed to allow space for passengers to stow luggage between the seat backs at floor level. The seats in the third-class cars are longitudinally arranged down each side of the car and are constructed of steel frames with wooden slats.

Trailer coach floors consist of $\frac{1}{4}$ -in. tongued and grooved boards laid longitudinally on the crossbars. On top of these boards $\frac{1}{4}$ -in. linoleum mottled buff in colour, has been laid with an underlay of cork matting, both of which are bedded in bitumastic adhesive. In the motor coaches, because of the proximity of electrical equipment, the floors consist of corrugated steel sheeting, filled with cork slabbing.

(To be continued)

LORRY—BUS—COACH

West Bridgford Seeks Consent

AN application by West Bridgford Urban District Council for consent under sections 101 and 102 of the Road Traffic Act, 1930, and deferred from December last, came before the East Midlands area Traffic Commissioners at Nottingham last week. It is in respect of the bus services between Nottingham and West Bridgford, the Nottingham terminus being Old Market Square. There had not been complete agreement between the urban council and Nottingham Corporation over the running of the joint service for the past seven years, said Mr. A. G. Mansfield, for the former, and West Bridgford considered that the receipts from these through services were not properly shared. It applied for formal consent for three reasons: To obtain legal equality between the two parties; to protect the public—for the existing agreement allowed the services to be terminated by either party at one month's notice; and to resolve any doubts about the legal position. He said there was no clear basis in the 1930 agreement under which the services are operated about the sharing of fares from the through service as they changed from time to time.

Figures for 1956-57 showed total receipts of £133,916, of which £11,760 was taken in the city and, by the terms of the agreement, belonged to the corporation; £17,235 was taken in West Bridgford and, by the agreement, belonged to the urban council; the remaining £104,921 was taken in through fares, and this was the point in dispute. The urban council had tried to negotiate with the corporation, but there was still no agreement entirely satisfactory to West Bridgford. Mr. L. C. Harrison, general manager of West Bridgford U.D.C. Passenger Transport Department, said he thought all receipts should be tied to mileage operated. He agreed that the joint-running agreement was entered into on the proposal of the West Bridgford council, but said it was now out-dated. "We want to be in a position to know we can negotiate with Nottingham and get a better deal out of the existing agreement," he said. Mr. A. G. Curtis, chairman of the commissioners, suggested that if the terms of the agreement were changed from one month's notice to six months' notice to terminate the public would not be in jeopardy. Mr. Harrison explained: "We are a little bit in arrears on the joint running at the moment. The corporation could in the future say 'We don't agree with this—tear up the 1930 agreement.' That could be done at a month's notice." Mr. R. O. F. Hickman for Nottingham Corporation, answered: "There is no fear of that happening." It will be recalled that this application in respect of the Nottingham—West Bridgford routes forming part of a wider application for consent covering routes between Broad Marsh Bus Station in Nottingham and Clifton Estate (see January 25 issue). The hearing of an application for consent in respect of Old Market Square was adjourned at that time at the request of the West Bridgford council.

Tailpiece to Knight Appeal

JUDGMENT has now been given by the Transport Tribunal on the appeal by T. Hesketh, Limited, of Widnes (see MODERN TRANSPORT,

June 22, 1957), against the refusal of the North Western area Licensing Authority to renew an A-licence. A decision on this appeal was reserved until the Knight case had been disposed of. The Tribunal says that the judgment on Knight must apply to Hesketh also; its only addendum is to observe that every departure from a previous normal user declaration must not be regarded as calling for the refusal of a subsequent renewal application. The exercise of a licensing authority's discretionary power to do so depends on the facts in each case.

Press-Button Teleprinter Relays

WEDNESDAY marked the formal opening of a press-button teleprinter tape relay installation at the British Road Services tape relay and switching centre at 238 City Road, London, E.C.1. This is the first installation of its kind to be engineered by the G.P.O. engineers; it is possible



Sunshine and snow: a 35-ft. long 80-passenger Sunbeam trolleybus at work in Colombo and, right, a 90-passenger vehicle of the same make ascending an incline in snowy Bergen, Norway. One of 18, it is to be joined by a further eight vehicles, the chassis of which are now being shipped

to forward immediately a message received from one teleprinter station to another, without reparation. The operator severs the incoming tape, reads the printed route code, puts it into an auto-transmitter and presses the appropriate destination button. All long-distance teleprinter traffic is routed through this centre.

Driving in Convoy Assailed

DISSATISFIED with replies to its letter to the Minister of Transport, Oxfordshire standing joint committee has invited Mr. Watkinson to send a representative to its next committee to discuss the "grave problem" created by drivers of heavy vehicles and coaches travelling in convoy. This, in the committee's view, constitutes a serious danger to other road users.

Penang Bus Unification Plan

PENANG public transport, including George Town City Transport Department and all private bus companies, may be combined into a public corporation. A scheme to place the entire city transport system under a board is being

prepared by Mr. Lim Kean Siew, chairman of the city transport committee. He plans to streamline the administration and increase efficiency. All private operators would be entitled to shareholdings in the proposed corporation.

Belfast Bus Station

PLANS for a Belfast bus station to be used by vehicles now starting from Oxford Street and Ormeau Avenue have been drawn up by the Ulster Transport Authority. It would be in Laganbank Road. The Belfast Corporation would develop a car park for 125 vehicles on a site opposite the bus station. A parking site for commercial vehicles is also proposed.

Haulage Wage Claim Adjourned

NO decisions resulted from the meeting last week of the Road Haulage Wages Council to consider the claim for a substantial increase in basic rates and other improvements, put forward by the trade union side. The claimed increase proved to be 10s. per week, plus an increase of 2s. 6d. in the subsistence allowance, a shortening of the period during which holidays must be taken and up-grading of a number of towns. There was no reference to the 30-m.p.h. speed limit for heavy

reinstatement of the scheme operated for 18 years before 1940, when daily "go anywhere" tickets were issued. If the application were granted, daily tickets would cost 10s. for adults and 5s. for children; weekly tickets (not available on Saturday) would cost 39s. 6d. for adults and 19s. 9d. for children. The application was supported by 16 local authorities. Mr. R. K. Cope, the company's deputy traffic manager, said that when the system was operated in 1923, he won a prize (and subsequently a job) for travelling 200 miles in one day.

C.N.R. Trailer-on-Flatcar Services

RECOGNISING the growing volume and increasing importance of the "piggyback" service, haulage of privately owned road trailers by rail, Canadian National Railways is to place this entire service under the Department of Road Transport. The general manager of that department will assume control over all for-hire piggyback services as well as railway-owned trailer operations of the same category.

Welsh Bus Service Economics

FOUR Welsh M.P.s, Mr. Roderic Bowen (Liberal, Cardigan), Mr. Tudor Watkins (Socialist, Brecon and Radnor), Mr. George Thomas (Socialist, Cardiff West) and Mr. Raymond Gower (Conservative, Barry), are seeing the Chancellor of the Exchequer to call attention to the problems of diminishing public transport services in Welsh rural and urban areas. This follows a discussion they had in London last week with Mr. F. H. Pengelly, traffic manager of the Western Welsh Omnibus Co., Limited.

Northern Ireland to Germany

FOR the first time a commercial vehicle has left Northern Ireland to drive with its load direct to a destination in Western Germany. The vehicle, a Leyland Comet-Scammell articulated 10-tonner, belonging to Northern Ireland Trailers, Limited, was loaded with 10 tons of Douglas fir bark from the Springwell Forest, Coleraine (Co. Londonderry), and was dispatched to Hanover for test processing by the builders of special machines for chipboard production. Leaving Larne for Preston on March 4 by Transport Ferry vessel *Bardic Ferry*, the load arrived at Tilbury early on March 6 and sailed at midday by *Empire Baltic*. It was due at Hanover on March 8.

Bus and Coach Developments

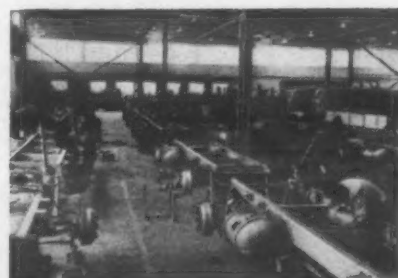
Western S.M.T. Co., Limited, seeks to join its Dalmington—Ayr and Ayr—Holmston services. Rochdale Corporation applies for a new Rochdale—Bacup service via Mettle Cote Housing Estate. C. Riley, Rotherham, seeks the licences of W. Smart and Co., Limited, Greasborough. Eastern National Omnibus Co., Limited, proposes summer weekend express services between Walton-on-the-Naze and Hasling, Sheerness and Eastbourne. Don Everall, Limited, applies for excursions and tours from Wolverhampton which were the subject of earlier application by J. T. Whittle and Son as successor to Harman Motor Services, Limited. Ribbles Motor Services, Limited, applies for the excursions and tours from Morecambe of Frank Bunn, Limited, Florence Excursions (Morecambe), Limited, and Kia-Ora Excursions (Morecambe), Limited, and of the latter two from Heysham. Wallace Arnold Tours (Devon), Limited, is applying for the excursions and tours from Torquay of Ruby Tours, Limited, which is also controlled by the Barr and Wallace Arnold Trust, Limited. Four Warrington coach operators—Naylor's Motor Services, Shadwell Motor Tours, T. Shaw, and F. Sykes and Sons, Limited, propose a joint Saturday express service in summer between Warrington and Rhyl, Colwyn Bay and Llandudno. If this is granted, their existing excursions and tours licences would be modified.



This Leyland bus is typical of the many hundreds built of Leyland running units that are operating all over Belgium.



The new Leyland assembly and service plant at Aalsmeer recently established to meet the needs of road transport in the Netherlands.



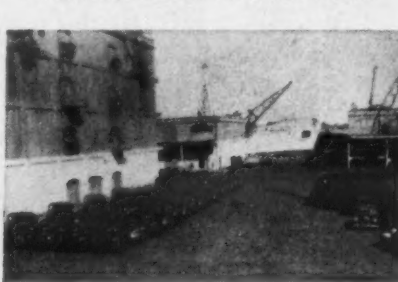
This interior view of part of the Elandsfontein (South Africa) factory shows a section of the assembly plant.



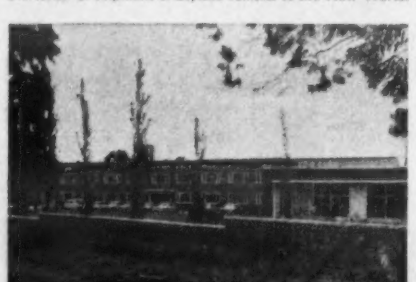
A typical example of Leyland despatch. This ship was specially chartered for shipment of Leyland vehicles to the New World.



The Service Training School at Leyland, established to keep personnel abreast of the times in the maintenance of the latest Leyland designs.



Part of a consignment of Leyland Comets for Argentina on the docks at Buenos Aires.



This extensive Leyland depot is the headquarters of a sales and service organisation that covers the vast territory from the Cape to Central Africa.

Leyland
sales and
service

go

hand-in-hand

Everywhere!

At Leyland, we have three objectives. Firstly, to make the best buses and heavy-duty trucks in the world. Secondly, to sell them all over the world. Thirdly, to keep them working at peak profit level throughout the world.

Leyland have agencies and depots in over 60 countries... manned by trained experts. If repairs are wanted, they do them; if spares are needed, they've got them!

Furthermore, Leyland have a travelling service of picked engineers always on call. Home-based teams fly to all countries to help and advise. Others, resident abroad, move from operator to operator. Further groups work from overseas depots effecting first-aid repairs from

mobile workshops. Added to all this, they advise on garage and repair shop layout, or plan schemes for driver training and teaching modern maintenance methods.

Although thousands of complete vehicles are exported direct to customers, they are also manufactured overseas. Assembly plants exist in a dozen countries in Europe and the Commonwealth, and factories for the complete manufacture of vehicles and engines are opened as required.

Comprehensive as these overseas arrangements are, they will never reach finality; they will always expand with sales.

For Leyland service accompanies Leyland customers to the ends of the earth!

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PETROLEUM RESEARCH

Royal Dutch-Shell Work in Britain

EXTENSIVE FACILITIES AT THORNTON CENTRE

IN the Royal Dutch-Shell organisation, research is accorded a place of great importance; how great can be gauged from the fact that about £12½ million has been spent by the group over the past year in the operation of 14 research centres in the United States of America, the Netherlands and Britain. The work of the laboratories covers all aspects of the group's activities, including exploration and recovery, refinery processes and product development. In Great Britain, research is the responsibility of Shell Research, Limited, and is carried out principally at Thornton, near Chester, and Woodstock, Kent. Woodstock deals with agricultural research while at Thornton Research Centre, which we visited recently, the emphasis is on applicational research, that is, the performance of oil products in service.

History and Organisation

Thornton Research Centre which is the larger of the two United Kingdom establishments and now employs nearly a thousand people, dates from 1941, when experimental work was started to

when developing a new grade of petrol or improving an existing one. As well as providing good starting, warm-up and acceleration performance and smooth running, the petrol must give knock-free running both in new and well-worn engines, and must not adversely affect the life of the engine. Thus, the work is grouped under three main headings: anti-knock quality, volatility and engine deposits. Since engines differ greatly in their fuel requirements, the petrol must be tested in a variety of engines and under a variety of conditions, both on the bench and on the road, before a final specification is reached.

Much the same sort of considerations form the basis of diesel fuel oil research, a major portion of which is directed towards improving combustion efficiency. Excessive noise, rough running and smoke emission are all evidence of poor combustion of the fuel and both the quality of the fuel and the design and condition of the fuel-injection equipment are important in overcoming these troubles. Extensive equipment, including many specially designed instruments, and bench



Assembling one of the many engines used for lubricating-oil tests; right, a hypoid axle gear rig for testing lubricants

study aviation fuel and lubricant problems. These facilities were placed at the disposal of the Government for the duration of the war, since when separate additional laboratories for a number of different product studies were successively established, to be co-ordinated into an integrated research centre in 1947. About half of the present employees are research workers, including 200 of graduate level, and the remainder provide the necessary administrative and technical services.

Research activities are divided primarily according to the products concerned; for example, fuels for various types of engine, engine and industrial lubricants, boiler fuels, petroleum chemicals and bitumen. In addition, there are sections that specialise in certain aspects of the work, such as the synthesis and chemistry of additives, analysis and metallurgy, blending, control and instrumentation, as well as more fundamental research. There is complete co-ordination with the work of all other laboratories operated by the group, including interchange of staff in order to widen experience or for work on special problems. The value of the work undertaken at Thornton is enhanced by the close touch that is kept with related research undertaken at universities, by government departments and by other industrial organisations.

Field Testing

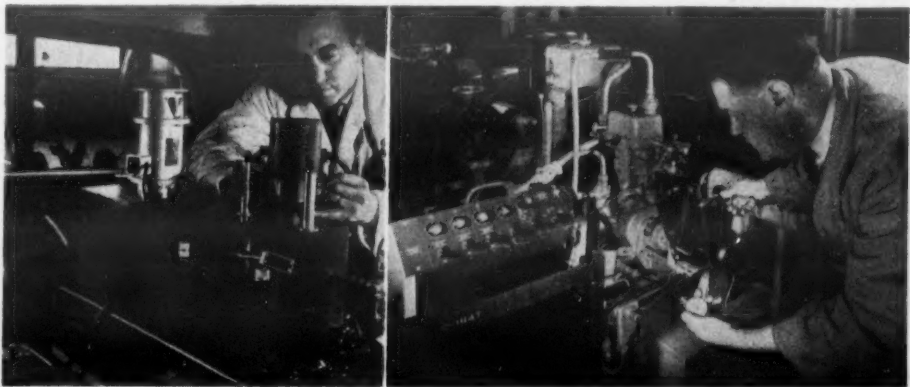
As well as work in the laboratories, the Thornton staff is directly concerned in extensive and continuous field testing in vehicle fleets, both Thornton-owned and those of operators willing to grant the necessary facilities, in industry and ships and with engine and other manufacturers. These facilities provide an intermediate stage in product development—the final stage before a product is released for consumer use—and also keep research in touch with technological development and

and field tests on engines and vehicles in close collaboration with engine and injection-equipment manufacturers have enabled Thornton to play an important part in achieving more efficient combustion and establishing the deservedly high reputation of the British automotive diesel engine.

Lubricant Research

Lubricant research follows two main paths, those of a long-term nature concerned with the chemical and physical properties of oils and greases and the more immediate problems of lubricant performance in current and projected engines and mechanisms. Despite the remarkable progress made in lubrication since the tallow and soap days—and there are now hundreds of oils and greases designed for specific applications—there is still much to be learned about the fundamentals of lubrication. It is only by increasing this fundamental knowledge that new and better lubricants can be developed. The general aims of research are to develop products that will minimise friction, reduce mechanical wear and prevent the formation of deposits, thus providing greater reliability and longer periods between overhauls. The attainment of these aims presents a never-ending challenge, for while new advances are continually being made, demands become progressively more exacting as engine and machine design advances and brings new problems of higher temperatures and increased surface loadings.

Another branch of research at Thornton concerns bitumen, which is coming into increasing use in a variety of industries, particularly in road-making, waterproofing and protection from corrosion (an article on some of the modern uses of bitumen appeared in MODERN TRANSPORT for December 14 last). The emphasis is on bitumen in road construction, involving preparation and



A self-contained mobile apparatus for measuring piston-ring wear by radioactive tracer method mounted in Standard Vanguard utility vehicle; right, research engine with electronic surface-ignition counters

market requirements, pointing the way to future research. Many tests are carried out by the Thornton research staff, using a variety of manufacturers' standard vehicles which have had special equipment fitted for the purpose. Tests are carried out on local disused airfields and also on the Motor Industry Research Association proving ground at Lindley, near Nuneaton, and the Montlhéry circuit, in France.

Fuel research work at Thornton is based on the concept that a fuel, whether petrol or diesel, is properly regarded as part of the engine. Consequently, although much chemical and physical work on the exact constitution of petroleum fuels is carried out, some hundreds of engines are in constant use. Some of these are specially built single-cylinder research units which give basic information on fuel performance; some are ordinary car and lorry engines fitted with precise equipment for controlling test conditions and recording behaviour; and others are prototypes of advanced design lent by manufacturers. In the last case, Thornton's recommendations can lead manufacturers to modify a new design, thus ensuring that not only is a fuel designed to get the best from an engine but that the engine is designed to get the best from the fuel and that no new engine reaches the market having awkward requirements for special fuels.

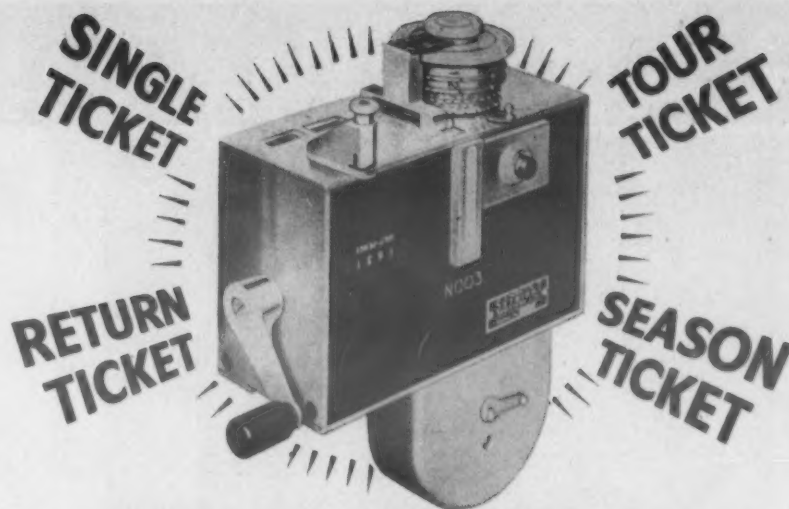
Many aspects of performance are considered

study of various mixtures on an experimental road carrying normal traffic as well as laboratory investigations. The broad objects of the research are to gain basic information to guide selection of types and grades of bitumen giving optimum performance in various applications; to indicate ways in which modifications by methods of processing or incorporation of additives can improve performance; and to lead to the development of special products and so extend the range of bitumen applications.

Facilities at Thornton

Much of the bench testing at Thornton in connection with road-vehicle components is carried out according to programmes which have been very carefully worked out to simulate conditions of actual service. But there remains some information that can only be obtained on the road and for this purpose, a large road test laboratory is operated. The layout of this department matches the two main divisions of its work; one side accommodates all the facilities for routine maintenance and repair of test vehicles while the other side is devoted to the preparation of vehicles for test. Preparation includes the fitting of such items as special distributors, thermocouples, recording apparatus and other instruments, mostly developed at Thornton.

(Continued on page 8)



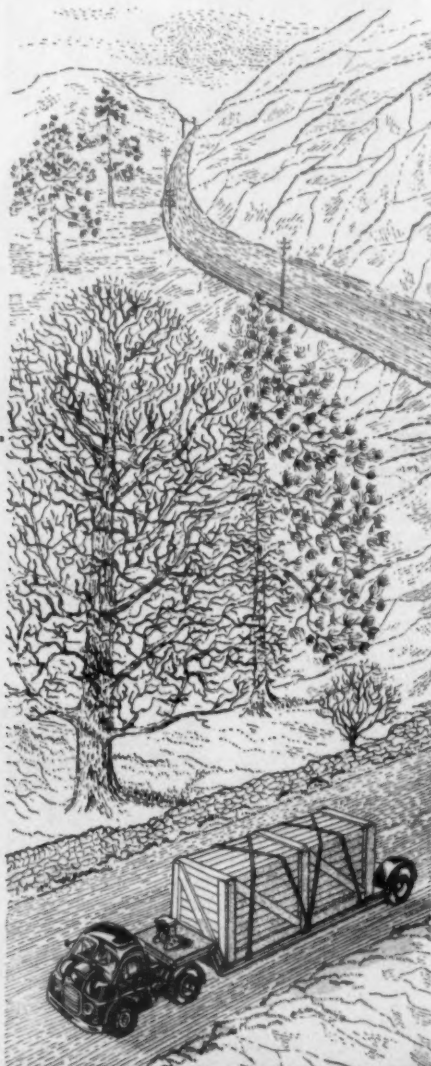
FROM THE SAME MACHINE

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AN unusual new liquid transporter, in which 10 huge rubber tyre bags forming the cargo containers are attached to axles trailed behind a "pillow-tyred" F.W.D. tractor, has been developed for the United States Army Transporta-



This unusual 5,000-gal. fuel train for use in undeveloped areas comprises 10 500-gal. Goodyear tyre bags towed by a "pillow-tyre" F.W.D. Teracruzer

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OFFICIALLY opened last month by Mr. C. E. Rust, assistant sales manager, Vauxhall Motors, Limited, was a new garage-service station at Scotland Road, Penrith, for the S.M.T. Sales and Service Co., Limited. Since the company acquired the premises in October, 1956, they have been largely rebuilt and re-equipped and now comprise a spacious filling station, a 2,500 sq. ft. showroom for new Vauxhall and Bedford and used vehicles, a comprehensively stocked stores and a 12,650 sq. ft. well-equipped service department.

Portable Vacuum Cleaner

THE electrical equipment division of Martindale Electrical Co., Limited, Westmorland Road, London, N.W.9, has produced a versatile

tion Research and Engineering Command by the Four Wheel Drive Auto Company, Clintonville, Wisconsin, U.S.A. The fluid containers, developed by the special products department of the Goodyear Tire and Rubber Company's aviation division, are 5 ft. high by 3 1/2 ft. in section and have a capacity of 500 gal. each. They are equipped with 50-100 g.p.m. filling and emptying systems and mounted in pairs on F.W.D.-developed axles and towing attachments embodying air-hydraulic brakes. The container-tyres and assemblies have resistance to a wide range of chemicals and fuels and can be operated in ambient temperatures between minus 65 deg. and plus 125 deg. F. For empty running, the container is inflated with low-pressure air or gas. Overall capacity of such a fuel train is limited only by the pulling power of the tractor, which can be a conventional or special cross-country vehicle. Towed by the F.W.D. Teracruzer, which runs on specially developed low-ground-loading ("pillow") tyres, it can obviously operate over terrain quite impassable to conventional road tankers.

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OPENING UP AFRICA

Development of Central African Airways

SERVING A FEDERATION

WHILE the Central African Airways Corporation is less than three months from its twelfth birthday, air transport in the area which it was established to serve—the Federation of Rhodesia and Nyasaland—goes back a good deal further. Between 1920 and 1933 there was a succession of small concerns which indulged mostly in charter and pleasure flights and in 1930 the Southern Rhodesia Government established the Civil Aviation Department. As was so often the case, it was really the advent of a regular service operated by Imperial Airways that provided the impetus for regular air transport operation and the route in question was that between London and Cape Town, which commenced as a through opera-

tion in January, 1932. In November of the following year Rhodesia and Nyasaland Airways, Limited, was formed with an authorised capital of £25,000, held largely by Imperial Airways (Africa), Limited, and the Beit Railway Trust, Limited.

The new company, which was popularly known as R.A.N.A., and was thus among the early examples of the airline fashion of being known by initials, took over the assets of the Rhodesian Aviation Co., Limited, which had the support first of the Cobham Blackburn company and later Imperial Airways, and Christowitz Air Services, which Mr. C. J. Christowitz had started in 1932 between Salisbury and Blantyre, in Nyasaland. R.A.N.A. began with a Westland Wessex and subsequently used the ubiquitous de Havilland Dragon Rapide. Its main function was to provide services connected with the Imperial Airways trunk route and this responsibility increased in

the new Salisbury airport at Kentucky. In the upshot the new field came into civil use in July, 1956, before the terminal building was complete, owing to the advent of the C.A.A. Vickers Viscounts which could not use Belvedere nor Kumalo, the Bulawayo airport. There would otherwise have been the situation that the nearest airport to the two largest centres in the Federation at which these aircraft were acceptable would have been the modern field at Livingstone opened in 1950.

Country Services

Although its traffic has risen remarkably during the past 11 years or so Central African Airways has no easy task since, in common with many



A de Havilland Beaver of Central African Airways at Lusaka and, right, a Douglas DC3 at Bulawayo on the heavily trafficked service thence to Salisbury

state-sponsored concerns, it has to provide facilities on various routes which can never be remunerative. It has now adopted the Canadian de Havilland Beaver for the maintenance of these routes, but whatever is done, and the type is remarkably economical, nothing can make the services economical when some of the points of call serve perhaps no more than half a dozen families. In short, C.A.A. must be prepared to lose something of the order of £100,000 annually on what it calls its country services. There are three groups of these, one operating in each of the territories. Those in Southern Rhodesia cover mainly the smaller towns lying between Salisbury and Bulawayo and Umtali and Bulawayo, while the Nyasaland services centred on Blantyre extend as far as Mbeya, in Tanganyika, which is served once a week. The third group, in Northern Rhodesia, cover the territory between Livingstone in the south and Ndola in

the north and Balovale in the north-west of the territory. Regional services are maintained largely with Vikings and DC3s. The most frequent service is that between Salisbury and Bulawayo with at least two flights a day in each direction, while there is also at least a daily service between Salisbury and Ndola in the Copper Belt with an intermediate call at Lusaka, the capital of Northern Rhodesia. The majority of the flights on this route is operated with Viscounts and these are also responsible for the Salisbury—Johannesburg operation in parallel with South African Airways. Another reciprocal operation is the coach class service between Salisbury and Nairobi which is balanced by an East African Airways operation. The latter, however, is routed via the coast and Blantyre whereas the C.A.A. flights call at Ndola, Kasama, Abercorn and Tabora. There is also a thrice-weekly Viscount service between the two



One of five Vickers Viscounts in the C.A.A. fleet seen at Salisbury; right, a Vickers Viking at Livingstone after operating the Sunday excursion flight from Salisbury

1937 when, with the changeover from land planes to flying-boats, the main route ceased to traverse the Rhodesias and moved down to the coast. The main connection was then made at Beira. The outbreak of war in September, 1939, was followed by the absorption of the airline in the Southern Rhodesia Air Force as a communications squadron and, as Southern Rhodesia Air Services, it maintained essential connections with neighbouring countries using Rapides and Avro Ansons.

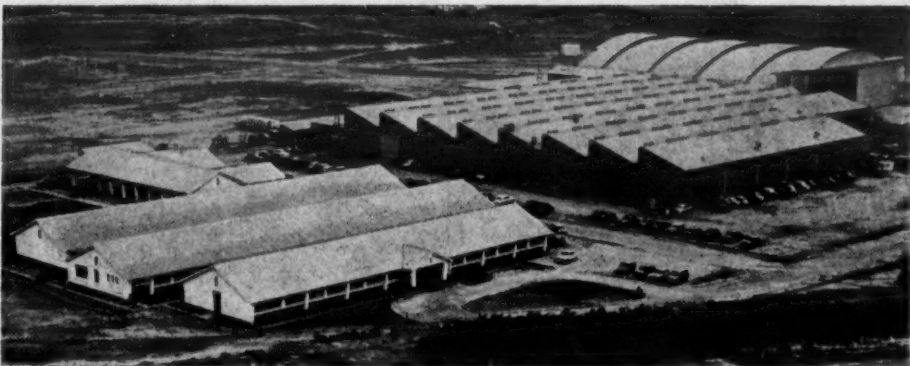
Establishment of C.A.A.

When the war ended in 1945 the Department of Civil Aviation was revived in Southern Rhodesia and the other territories took steps towards renewed development of air transport, which it was realised held great potentialities for countries anxious to expand. Discussions led to agreement to establish the Central African Air Authority and the Central African Airways Corporation and the

capitals with one flight via Blantyre and Dar-es-Salaam and the others via Lusaka and Ndola. The weekly operation starts and finishes at Johannesburg. The Copper Belt is connected with the coast at Lourenço Marques and Durban, the former being served once and the latter twice a week by Viscount flights from Ndola via Lusaka and Salisbury. Airport limitations at Bulawayo cause the service thence to Johannesburg to be operated with Vikings thrice a week. Flights on the other days are maintained by South African Airways with a DC4.

Northwards from Bulawayo there are four flights a week to Livingstone with two continuing to Lusaka. It is normally necessary for passengers between Salisbury and Livingstone to travel via Bulawayo or Lusaka but on Sundays there is a special excursion flight leaving Salisbury in the early morning and returning in the evening on which ordinary passengers also are carried. Editorial reference to this excursion was made in MODERN TRANSPORT of March 2, 1957.

(To be continued)



The C.A.A. headquarters at the new Salisbury airport with the administrative offices in the foreground, the workshops and, behind them, the large hangar which was originally the theatre at the Bulawayo Centenary Exhibition

necessary legislation was put through in the three territories. Thereafter Central African Airways took over Southern Rhodesia Air Services and began the programme of development which has brought it to its present importance.

The first step was to obtain larger and more modern aircraft to enable regional services to be developed and orders were placed for Vickers Vikings, while de Havilland Doves were purchased for the development of feeder services. The first Vikings commenced operation on November 19, 1946, and their advent necessitated the construction of a hard runway at Belvedere, the municipally-owned airport at Salisbury which was leased to the Southern Rhodesia Government. This was put in six weeks, which was a very remarkable achievement in the difficult circumstances then prevailing. Although it was not anticipated at that time, the much circumscribed Belvedere with its limited buildings was to remain the headquarters of C.A.A. for more than ten years owing to an interruption of more than two years in work on

capitals with one flight via Blantyre and Dar-es-Salaam and the others via Lusaka and Ndola. The weekly operation starts and finishes at Johannesburg. The Copper Belt is connected with the coast at Lourenço Marques and Durban, the former being served once and the latter twice a week by Viscount flights from Ndola via Lusaka and Salisbury. Airport limitations at Bulawayo cause the service thence to Johannesburg to be operated with Vikings thrice a week. Flights on the other days are maintained by South African Airways with a DC4.

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(To be continued)

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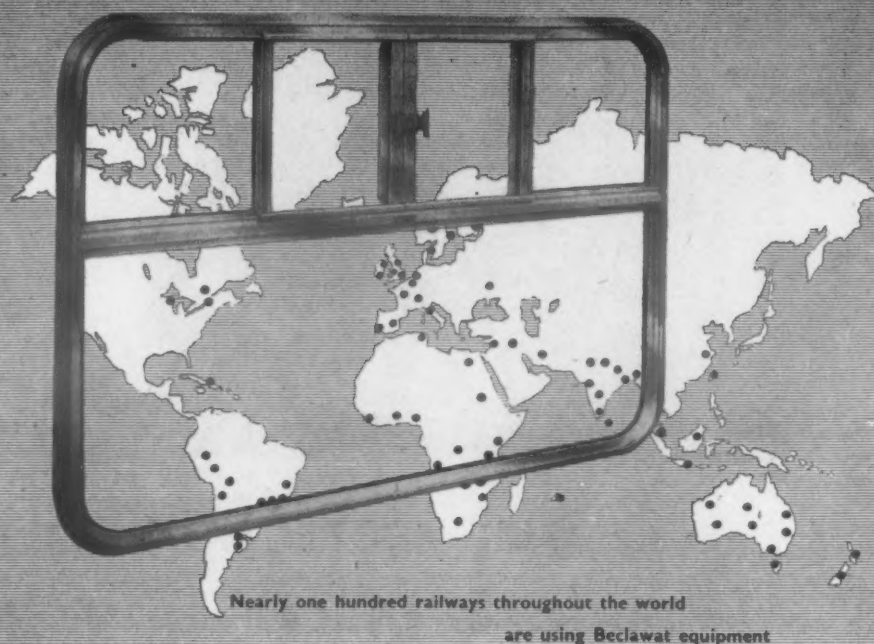
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WIDE ALUMINIUM PLATE Automatic Butt-Welded Product

ALUMINIUM plate for general engineering purposes can now be obtained, for the first time in this country, in widths up to 11 ft. This new product, developed by Northern Aluminium Co., Limited, to overcome limitations of rolling equipment that have hitherto restricted aluminium plate to widths of 7 ft. or less, is produced by butt-welding two plates together. The welding is carried out automatically in a special jig, and techniques have been developed for individual sizes and gauges of plate which ensure that no distortion occurs. Since the weld bead is ground flush, the resulting wide plate is comparable in appearance with normal rolled material. The strength of the weld, made by the most advanced process in controlled conditions, is higher than can be ensured by welding during subsequent fabrication.

Typical properties across the weld in plate to B.S.1476:NP5/6 (the specification covering an alloy frequently chosen for welded aluminium plate work) for example, are a 0.1 per cent proof stress of 8 tons per sq. in. (the same as the minimum demanded of unwelded material by this specification), a U.T.S. of 16.3 tons per sq. in. (compared with 17 tons per sq. in. specified) and an elongation of 11 per cent (compared with 12 per cent). It will be seen that for most purposes the presence of the weld need hardly be considered.

The advantages of welded plate will be apparent. The amount of welding that the user must do himself, which represents a major ship-building cost and a considerable item in the making of aluminium vessels, tanks and similar fabrications, will be reduced, and in arranging a structure the designer will no longer be hampered by the limitations of small plate sizes. Details of the available sizes of Noral welded plate are obtainable from the maker, but in general, in the usual alloys and gauges chosen for welded aluminium equipment, plate can be supplied up to 30 ft. by 11 ft. The new material undoubtedly represents an increase in the scope of design in aluminium for many industries.

At the Wolverhampton factory of John Thompson, Limited, a Unionmelt installation supplied by Quasi-Arc, Limited, is now being used for the welding of cylindrical pressure vessels for the atomic energy and other industries. The roller bed of the installation can support, traverse and rotate vessels of up to 18 ft. in diameter, 30 ft. in length and 48 tons in weight.

PETROLEUM RESEARCH

(Continued from page 5)

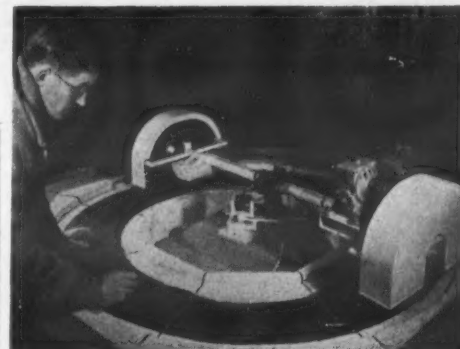
The wide variety of vehicles passing through the laboratory include company-owned vehicles, private vehicles made available for product testing by Shell employees and vehicles owned by commercial firms and national bodies with whom arrangements for field testing have been made. Some of the vehicles owned other than by the company continue in normal service with their owners. On completion of tests, engines or other components are dismantled and inspected by laboratory staff, which thus accumulates an extensive background of data on the performance of the group's fuels and lubricants under a variety of service conditions.

The laboratory staff undertakes much test work itself, a good deal of which is carried out on the runway and tracks of the former Hooton aerodrome. Here, tests of different vehicles with different grades of fuel and lubricant, with the aid of the special test and recording instruments, can be carried out under closely controlled conditions, free of the variations in behaviour imposed by traffic conditions on the road.

Chassis Dynamometer

Even the close control of comparative tests that can be exercised on such a track does not meet all conditions. For example, varying weather and surface conditions can affect the results obtained. Neither do the combined road and track testing that can be carried out in this country cover all the conditions likely to be met by the products in service, for instance, operation in extremely hot climates or in mountainous country. To meet these conditions, the laboratory has recently installed a chassis dynamometer which provides a means of checking the performance of a vehicle under precisely controlled conditions as well as of studying its operation over a range of simulated gradients and at high temperature. The dynamometer is a versatile piece of test equipment, adjustable to take a variety of chassis.

Observation of the behaviour of engines and components with various fuels and lubricants at the other end of the temperature scale is provided by three cold rooms at Thornton, in which temperatures down to minus 65 deg. F. are obtainable. One of the more trying problems in petrol engines is that easy starting and quick warming



A model road apparatus in a cold room
used for bitumen studies

up under winter conditions require good volatility of the fuel. But a highly volatile fuel evaporates more freely in the carburettor, cooling the metal parts, so that ice forms when the air is cold and humid, causing stalling, loss of power and high fuel consumption. A detailed study of carburettor icing at Thornton has led to the development of petrols that have good starting and warm-up performance without causing icing.

Looking to the Future

Reference has already been made to work on combustion problems and on diesel-engine fuel-injection problems. The well-equipped laboratory has an engineering side in which all the fuel-injection equipment used in the laboratory can be overhauled and calibrated. The laboratory is also deeply concerned with problems of petrol injection. Started on the test bench some years ago, testing is now being extended to the track and road with new cars with petrol injection.

Probable requirements for engines of the future are also behind an extensive research effort devoted towards a better understanding of such basic combustion problems as knock. With the present trend in petrol engines towards higher compression ratios, the work directed towards keeping ahead of current fuel requirements is continuous. Apart from studies using variable-compression single-cylinder research engines, use is also being made of a current-series B.M.C. four-cylinder engine in which modification has raised the compression ratio to 12 to 1. A remarkable tribute to the soundness of modern automotive engineering is the fact that this engine, quite standard apart from the compression ratio, has been running at this greatly increased loading for several thousand hours without trouble.

With the co-operation of the Atomic Energy Research Establishment, Thornton Research Centre was the first in this country to use the radioactive tracer method of determining engine wear. Earlier methods of measuring wear by weight loss or dimensional changes were extremely protracted and tedious and the radioactive tracer technique, which avoids the need to strip engines between test periods, has revolutionised this facet of lubricant research by making it possible to record wear continuously. Although work so far at Thornton has been confined to determinations of piston-ring wear, fundamentally the method is equally applicable to wear of other engine parts.

Usefulness of the tracer technique, which started out as a purely laboratory tool, has been extended at Thornton by its application to the engine of a vehicle running normally on the road and it is now used in three different ways. In the first, a four-cylinder ordinary production engine running on the bench is fitted with two radioactive top compression rings, wear products from which are carried into the sump with the lubricating oil. The sump oil is circulated past a scintillation counter, where the accumulation of radioactivity, and hence the piston-ring wear, are recorded. In the second, a similar engine fitted to a car has one piston with a radioactive top ring. After a test run on the road, the oil system of the car is coupled to the recording equipment for determination of the amount of wear during the run. The third application, probably the first of its kind in the world, is a completely mobile recording apparatus carried on the vehicle. With the aid of radioactive piston-rings it is possible to follow the effect of changes in driving conditions on engine wear while running on the road.



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GAUGE STANDARDISATION IN AUSTRALIA

Revival of Interest

MR. P. J. HANNABERRY PLEADS FOR ACTION

RECENTLY there has been a welcome revival of interest in the standardisation of railway gauges in Australia, as a result of which standard gauge tracks will be provided through Victoria into Melbourne (as already recorded in our columns) so that New South Wales through services can be operated. New South Wales trains can already reach the Queensland capital in Brisbane, where the gauge is 3 ft. 6 in. In Victoria and South Australia the 5 ft. 3 in. gauge prevails; South Australia also has a considerable mileage of 3 ft. 6 in. gauge track and the Commonwealth Railways Central Australia and North Australia lines are to that gauge. But the Trans-Australian Railway is 4 ft. 8½ in. gauge and part of the Central Australia has been converted to standard gauge on a new alignment to carry coal traffic from Leigh Creek (albeit at a rate fixed by Government agreement about one-third of standard). The Commonwealth Commissioner of Railways, Mr. P. J. Hannaberry, in his latest report, sets out his views on breaks of gauge and the progress of rail standardisation proposals.

Breaks of Gauge

For years I have directed attention, he writes, to the frustration of the efforts of the Australian railways administrations to provide the highest standards of through interstate traffic, and the economic loss to the community, directly attributable to the lack of a standardised railway gauge. The railways have expended vast sums in recent years on the provision of diesel-electric locomotive power and modern rolling-stock for both passengers and freight, but due to the continued existence of breaks of gauge the full benefit of this

transfer stations, and it becomes abundantly clear that the problem of broken gauges is one which must be tackled without further delay.

Delays

The Trans-Australian Railway, particularly if it is to operate profitably, depends upon freight, and especially interstate freight business, and it has the facilities to handle a far greater traffic than is offering. Efforts to increase the tonnage offered for rail carriage are severely handicapped by the break of gauge problem. Goods from Victoria for Western Australia pass through two breaks of gauge points, necessitating transfer and, consequently, delay and possible damage to goods. Traffic from Sydney to Western Australia has to be transferred at three points, and goods which, on the distance involved, should be carried from, say, Sydney to Perth in not over five days, are usually fourteen days in transit and frequently even longer.

Another very important phase of the matter is the availability of rolling-stock. With hold-ups at transfer points eliminated, locomotives and wagons could be used for far more journeys to and from such stations than is possible under existing conditions. The delays to locomotives and trucks at border points involve the railways in the construction and upkeep of far greater numbers of locomotives, carriages, brakevans and wagons than the tonnage handled really calls for, adding greatly to the needless expenditure caused by the gauge problem. Whilst breaks of gauge are permitted to continue, fluidity of rolling-stock cannot be achieved. How often do we see a seasonal emergency in one State, e.g., drought or



One of 40 Metropolitan-Vickers 3,820-h.p. electric locomotives now in service on the Sydney—Lithgow line through the Blue Mountains, New South Wales Government Railways; if recommendations are followed the standard gauge would be greatly extended in Australia

expenditure cannot be obtained. There can be no doubt that the elimination of breaks of gauge, particularly on the Sydney—Broken Hill—Port Pirie—Adelaide route, and on the Sydney—Albury—Melbourne run, would permit of tremendously improved services being provided, of far greater capacity, faster, more efficient and more economic, than can be given under existing conditions. The railways are equipped to handle a far greater traffic than they are receiving.

The lost traffic is now carried by road, largely on account of the annoyances and disabilities arising directly from the delays, damage, and mixing of consignments which arise out of intermediate transfers at break of gauge points. The States' highways, according to authoritative statements from time to time, are deteriorating seriously under the stress of road freight haulage, aggravated by floods in certain areas. The expenditure of an immense sum is reported to be necessary for their rehabilitation. The removal of the artificial barriers caused by breaks of gauge would divert traffic back to the railways fully equipped to handle it. This would relieve the authorities responsible for road maintenance of a large proportion of what is becoming, to them, an intolerable burden.

Transfer Equipment

The existence of breaks of gauge involves the railways departments in the provision of costly transfer equipment to facilitate transfer of traffic, particularly of goods and livestock, requires the employment of manpower which could be more profitably used on other work, causes serious delays in the transport of goods, increases the liability of goods being damaged or lost, prevents locomotives and rolling-stock being used to their full potential, and leads to congestion of traffic at transfer stations and on the lines leading to such places. These disabilities inevitably increase the cost of transport and seriously affect the ability of the railways to carry out their task of transporting goods quickly, efficiently, and economically. Quite apart from the cost of transfer work, the economic loss and interference with the conduct of businesses, due to delays to traffic at transfer stations, are an extremely important aspect of this problem, and one that, all too frequently, is overlooked. Interest on the cost of locomotives and rolling-stock standing idle, and therefore unproductive, whilst the work of transfer proceeds, should be added to the interest on the capital value of the transfer equipment, i.e., cranes, gantries, loading and unloading platforms, mechanical handling equipment (roller conveyors, fork lift trucks, mobile cranes), and the actual physical cost of handling. The locomotives and rolling-stock, if not held up on account of transfer operations, could be earning revenue on other parts of the railway system where probably they are badly needed.

The economic loss involved in these items, however, is not the only loss arising directly out of the variety of railway gauges. Due to the delays in transit because of breaks of gauge, merchants must manufacture and carry stocks far above what would be required if there were no delay at border stations. This results in higher prices, causing further direct economic loss to the community. Add the further loss due to interest charges on locomotives and rolling-stock standing idle at

other crisis, calling for the urgent use of large numbers of locomotives and rolling-stock which cannot be supplied, because all engines and rolling-stock in that State are already in active use whilst, in an adjoining State, locomotives and rolling-stock are not being used to capacity but cannot be loaned to the neighbouring State because of differing gauges.

If the time were to come again when urgent movement of troops and equipment, stores and materials to and from particular areas became necessary, the impracticability of moving locomotives and rolling-stock rapidly from State to State could well prove fatal to even the most gallant efforts to defend our country. During the 1939-45 war the railways were called upon to perform a tremendous task, and responded magnificently, but it could not be denied that their efforts were sadly hampered and seriously weakened by the breaks of gauge.

Consistent Advocacy

The Commonwealth Railways Commissioners over the years have consistently advocated standardisation of railway gauges and, as the first and most urgent step, the conversion of the Broken Hill to Port Pirie Railway, with standard gauge link between Port Pirie and Adelaide. It has been pointed out that this railway handles heavy tonnages annually, and forms a very important link, both strategically and commercially, between New South Wales and Western Australia. Its conversion to standard gauge would reduce delays to passengers, mails and freight, and would confer other benefits, e.g., it would—

- (a) provide a continuous standard gauge railway between Brisbane and Kalgoorlie, 2,676 miles;
- (b) shorten the rail route across Australia by 252 miles;
- (c) eliminate two breaks of gauge;
- (d) permit of interchange of rolling-stock between the New South Wales and Commonwealth systems; and
- (e) be a permanent asset to Australia.

The question of providing a uniform gauge for Australian Railways is not a new one. As far back as August, 1897, the Railways Commissioners of Australia reported that, in view of the contemplated Federation of the Australian Colonies and the desirability of providing the utmost facility for inter-communication, they were "impressed with the necessity of having as soon as possible a uniform gauge." At that time the estimated cost of the provision of a standard gauge on the New South Wales, Victorian and South Australian systems was £2,360,500.

Conferences

In July, 1920, it was agreed by a conference of Federal and State Ministers to appoint two experts from overseas, and an Australian not connected with railways, to consider and report upon the unification of gauges, the gauge which should be adopted, and the cost of conversion. A Royal Commission so constituted was appointed, and recommended as follows—

- (a) a 4 ft. 8½ in. gauge railway from Fremantle to Kalgoorlie;
- (b) a 4 ft. 8½ in. gauge railway from Port Augusta to Adelaide;
- (c) conversion of the whole of the 5 ft. 3 in. gauge lines of South Australia and Victoria;
- (d) a 4 ft. 8½ in. gauge railway linking Sydney and South Brisbane, via Macksville, Kyogle and Richmond Gap.

(Continued on page 25)

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MODERN ROLLING STOCK

Work of British Contractors

By L. B. ALEXANDER, London Manager and Special Director,
Metropolitan-Cammell Carriage and Wagon Co., Limited*

THE leading rolling stock contractors not only build for the British main-line railways; they also build the trains for London Transport, acknowledged to be the best underground system in the world, and they build a great deal for export. The carriage and wagon industry in this country was in the past built up largely on its export trade and, as a matter of interest, the export figures for completed vehicles are some £10 million and for spare parts some £15 million per annum.

Design Considerations

It is, I think, appropriate first to consider how far railways can go in being modern and what inherent limitations there are in the rolling stock itself in this respect. The following are the main factors which affect both wagons and carriages:

- (1) The conditions of service necessitate a vehicle strength and safety beyond what is necessary merely to support its own weight and load, as
 - (a) Vehicles have to run in trains. In the process of marshalling, shunting and running, they must absorb shocks and heavy loads of compression and tension.
 - (b) The metal to metal contact with the unsprung weight of wheels and axles running on rails over points and crossings and uneven track necessitates robust running gear to compensate for these harsh conditions.
 - (c) Running on a rigid track requires extra reliability as the breakdown of one vehicle affects not only its own train but the trains following on.
- (2) Railway charges depend on writing off passenger vehicles over at least 30 years and goods vehicles over 40 years. (At any one time, therefore, only a portion of the fleet will look modern, unless originally those concerned hit on some unusually inspired design.)

Carriages

As far as carriages alone are concerned, firstly, the conditions of service largely determine the shape. Carriages have to be pictured running as trains and not as individual units and their cross-section has to conform to the structural loading gauge determined by tunnels, bridges, platforms, signalling equipment, etc. Secondly, the journey time will largely determine the type of accommodation necessary, from the comparative austerity of suburban travel to the more lavish amenities required for transcontinental travel.

These factors must be stated to show that whilst realising there may always be room for improvement in techniques, in styling and in finish, there is no room for the "airy fairy" in rolling stock design. However modern you make carriages and wagons they are still going to look recognisably like carriages and wagons and not like spaceships of one kind or another. Besides, if you attempt to be ultramodern there is the danger of following mere fashion, which very soon becomes out of date.

Limitations on Contractors

What now are the limitations under which we as rolling stock manufacturers have to work? In this

* Abstract of a paper presented to the Metropolitan Section of the Institute of Transport

respect, I mean private contractors and not railway shops? There are two main factors. Firstly, a contractor only builds to specific orders. With the notable exception of the contracts from the British Railways during the period since this last war, railways in general do not order their rolling stock regularly. You cannot therefore be sure that publicised requirements will result in orders being placed when expected. When the present modernisation plan is finished we shall no doubt be back to the old conditions of "feast and famine."

An illustration of the fickle nature of this market was in 1947-48, when to back up the Baillieu Mission to the Argentine our industry made plans to put no less than a third of its total capacity at the disposal of the Argentine Railways much publicised five-year plan. It turned out that the industry got one single wagon order out of that plan and all the rest of the rolling stock was cancelled. Under Peron's mismanagement of the

country the Argentine market faded out completely.

In 1954 the Director-General of the Indian Railways, which had been ordering an average of 2,000 to 5,000 wagons per year abroad, told us that they would build all their own wagons in future and that to ensure this they had placed numbers of pilot orders on local firms. In the following year India ordered from abroad—with the assistance of American aid but also largely on their own account—over 30,000 wagons.

Variegated Orders

So much for the joys and uncertainties of attempting market research. Another main limiting factor is the way in which each successive order differs in type from the preceding one. This is due to the fact that apart from there being six major different track gauges in the world, these are combined with widely varying structure gauges, and widely varying types of traffic, climate and other conditions of service. Each railway wants to take the maximum advantage of its gauges, so that almost every railway in the world has its individual structural requirements. This has meant that our industry has had to live on a large number of comparatively small orders. The keynote is flexibility and versatility.

Real mass production of coaching stock does not apply and wagon orders for 2,000 and up are exceptional. Owing to the variety it is impossible to carry large stocks of material and our whole organi-

sation has to be built on methods which will allow for a series of quick changes from one completely different type to another. At one of our three works in the last five years, there were 23 orders, 19 different types of wagons, three follow-on orders and besides these there were repeat but not follow-on orders for Coras Iompair Eireann and India. Some of those were good runs but none justified tooling on motor car factory lines. We do not expect the pattern of work in the future to differ much from what we have had since the war. In these 12 years we have produced more than 140 different types of wagons and over 100 different types of coaches and railcars.

New Design

What happens when the customer wants something radically new? Just this; it has to be designed and making the production drawings takes a considerable and inescapable length of time. The development of design when one is breaking fresh ground and the subsequent detail work in the drawing office can take many months. A very great number of drawings is required. For example, on the aluminium alloy cars we made for London Transport in 1951-52 some 500 drawings were made and the schedule of material ran into approximately 4,500 items. The lightweight steel coaches now being built for South Africa run to over 2,000 drawings and 10,000 items, excluding all electric and traction equipment.

This preliminary process is inescapable because the working drawings are the basis of economical production in the factory and they have to be as complete as possible in every detail. Common-sense demands that the maximum amount of work is done conveniently for effort and accuracy on the bench or on suitably placed jigs, and provision made in modern metal structures for the exact positioning of furniture to be installed at a later stage. As little as possible in the way of fitting is done on the vehicles, in the first place to avoid working at an awkward angle, and in the second place to avoid men and equipment, tools, cables, etc., getting mixed up and in each other's way.

Planning

Orderly and economic production has to be preceded by a considerable amount of works planning: sometimes special machinery and equipment have to be acquired. This may be started on the basis of the drawings made for tendering, but the making, the marking up and checking of many jigs and templates can only be started after receipt of working drawings. The modern technique of stress analysis and subsequent strain gauging marks not a step but a leap forward from the prewar empirical approach to design, good as this had, after a fullness of experience, often turned out to be. For an order such as this it may take up to two years from date of order to the first carriage.

Not all new designs need the full procedure of exhaustive stress analysis followed by strain gauging. Where the construction is not cut down too finely on weight, a less complicated assessment of stresses is adequate and the structure can simply be tested for deflections under a proof load. The entirely new design of diesel railcar twin units which are being built for the British Railways was a job of this nature. It took 18 months for the first unit to be built. I want to emphasise these delivery periods with those who might otherwise think that

(Continued on page 25)

MODERN TRANSPORT IN LUXEMBOURG



Luxembourg, historic fortress capital of the Grand Duchy, is also the focal point of that country's transport system. The 33 buses in the Ville de Luxembourg fleet include the A.E.C. with Van Hool bodywork on the Hollerich route and the one-man operated Leyland-engined Brossel seen at the station. A fleet of 28 trams and 20 trailers (below) helps serve the population of 79,000; the total bus fleet of the duchy is 320. The final view depicts new rolling stock for the recently electrified sections of railway, owned by the Belgian National Railways. Under Budd licence 22 two-car sets have been built by La Brugeoise et Nivelles of Bruges. All axles are motorised and electrical equipment is by A.C.E.C. of Charleroi. The 28 first-class and 143 second-class seats, with standing room for 70, are provided in a tare of 79 tons per two-car unit.

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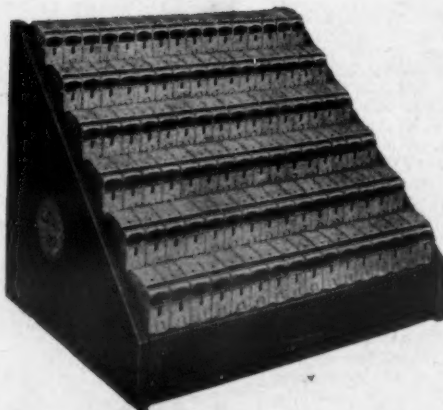
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INTERURBAN COACH SYSTEM

Extraordinary Greyhound Network in America

A PASSENGER TRAIN BEATER

SUMMER coach travel (or bus travel, as Americans call it) during 1957 was the greatest in United States history, according to the Greyhound Corporation, America's leading interurban passenger carrier. More travellers went by bus than ever before; they took longer vacations and travelled greater distances. Based on these satisfactory results, Greyhound is planning for an increase of more than 15 per cent in its tour business during 1958. Seasonal touring is, of course, a relatively small proportion of the business annually handled by the various divisions of the Greyhound undertaking, which is the only system to serve all 48 of the United States, as well as Canada, and also has direct connections into Mexico.

The nationwide Greyhound system operates 7,000 vehicles over more than 100,000 miles of routes. Buses bearing the racing greyhound trademark cover some 1,500,000 miles a day, and generate almost 10,000 million passenger-miles a

early days of the business, heating the buses during the severe northern winters was a major problem, for the method of heating through the exhaust pipe system, with its attendant danger of carbon monoxide poisoning, was outmoded. Caesar solved the problem by designing a hot-water heater. In those days, too, operators had to clear the snow off the roads if they wished to continue operating during snowstorms. Greyhound's answer was a truck-driven snow-plough; the basic design is still in general use by state highway departments.

In striving to cut operating costs to permit lower fares, Greyhound's aim has always been to increase seating capacity in each new bus model, and at the same time provide larger and more comfortable vehicles with improved visibility, ventilation and temperature control. Before 1927 the largest buses—and their size, of course, is limited by state regulations—carried only 29 passengers. In that year Greyhound introduced the 33-seat bus. In

Form No. 10
Printed in U. S. A.

FUEL - OIL AND MILEAGE RECORD

DATE: _____ MONTH: _____ YEAR: _____

DRIVER: _____

VEHICLE: _____

ROUTE: _____

START: _____ STOP: _____

FUEL: _____ OIL: _____

MILEAGE: _____

RECORD OF GREASING—BATTERY SERVICE—OIL CHANGE

DATE: _____ MILEAGE: _____

COMPLETE GREASE: _____

BATTERY SERVICE: _____

OIL CHANGE: _____

TRANSMISSION OIL ADDED: _____

DIFFERENTIAL OIL ADDED: _____

Specimen sections of Greyhound vehicle service record forms

year. The development of this amazing network of public transport facilities in a space of well under half a century makes a story well able to take its place alongside other of America's traditional "local boy makes good" legends.

From a Two-Mile Route

The progenitor Greyhound—although the name was as then unknown—was a solitary Hupmobile that in 1914 negotiated the two-mile rutted route between the communities of Hibbing and Alice in the iron-mining district of Minnesota. Road transport in the United States then being primarily horse-drawn, the few mechanically propelled vehicles available for hire between the two communities were naturally popular, even with a single fare of a dollar and a half, no small amount for a two-mile journey.

Carl Wickman, owner of the Hupmobile, soon saw that his future lay not in selling motor cars, as he had planned, but in building up the Hibbing—Alice run. Wickman, a Swedish immigrant, began scheduled hourly departures with a one-way fare of 15 cents, or 25 cents for the round trip. His Hupmobile was overcrowded on nearly every journey, but no one else believed that his enterprise would amount to very much. There was one

1934, in collaboration with General Motors, the rear-engine vehicle, of integral construction, with a seating capacity of 37, was developed. Two years later, Greyhound first presented the air-conditioned bus, and in 1938 the diesel engine was adopted.

Scenicruiser

Although the war held up the project for several years, plans for the present deck-and-a-half Scenicruiser were first made in 1940. In 1954 this revolutionary bus was put into service on major routes. The 40-ft. Scenicruiser seats 43 passengers and its features include a raised observation level, washroom facilities, air suspension, twin diesel engines, and greatly improved air-conditioning. The initial order for 1,000 represented an investment of more than \$50 million in rolling stock.

Until the death of Wickman, in February, 1954, the trio that included Bogan and Caesar, with many of their early associates, were at the helm of the Greyhound Corporation. Today, Orville S. Caesar is honorary chairman of the board of directors and Bogan is retired executive vice-president. Wickman had resigned from his position as chairman of the board in 1951, but remained active as a director until his death. Caesar served as president of Greyhound from 1946 until January, 1956.



Greyhound coaches in a rural Californian setting at one of the company's post houses

exception, however, Ralph Bogan, who started operating over the same route at the same fares. A fare-cutting war inevitably followed until Wickman suggested a merger.

Early Success

The success of the Wickman-Bogan combined operations formed the basis on which the present-day Greyhound system was built. More buses, with hand-built bodies on truck chassis, gradually followed, and routes were extended to the adjacent city of Minneapolis. During this early period of growth, Wickman met and persuaded a third partner to join the team—Orville S. Caesar, who had started his career as an automobile mechanic and was operating a successful bus line in Superior, Wisconsin. From these small beginnings the Greyhound pioneers launched a programme of buying and expanding bus lines, and integrating services so that by 1926 they had the foundations of the first truly national bus system, with routes from coast to coast.

The intricacies of corporate financing and the operation of dozens of newly acquired bus lines would have been enough to keep the average business man in what is called, in American parlance, the "ulcer stage." These three men were, however, well above average; they also shared a hobby—an interest in automotive design and improvement. What they did for their own relaxation, therefore, resulted in more reliable and more comfortable buses for the travelling public.

The old adage about necessity being the mother of invention was certainly true for them. In the

On that date he was succeeded as chief executive officer by Arthur Genet, a man exceptionally well qualified for the position. At the age of 48, Mr. Genet has not only achieved success in transport, but also has a thorough grasp of banking and financial management. He has launched a programme of diversification to utilise more fully Greyhound's facilities for serving the public.

Fleet Name

The familiar name of Greyhound was not adopted until 1926. During the peak years of the 1920s, the fast-growing concern was called the Motor Transit Company, but its several constituent bus lines operated under a wide variety of colourful names. A search was begun for a suitable name for all companies, and one that could be used effectively in national advertising. A Western Michigan company which had joined Wickman and his associates in their plan for a nationwide bus transport system used a racing greyhound as its trade mark. Patrons of that company were soon referring to it as the "Greyhound Line," and its grey buses were popularly known throughout the territory as "Greyhounds."

This convinced the founders that it was the ideal name, and Greyhound has become synonymous with long-distance road passenger operation in the United States. The name is so well known, in fact, that television's newest star is the greyhound which appears in all the Greyhound Corporation's TV advertising: this canine youngster—Steverino—is featured every Sunday night on the multi-

(Continued on page 26)

You're on the Right Road

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PAX II

DENNIS

- ★ EXTRA LOAD SPACE
- ★ WIDER VISIBILITY
- ★ NEW CAB COMFORT
- ★ CHOICE OF WHEELBASE
- ★ LOW OPERATING COSTS



The new Dennis DB Series Pax II, superb in design and performance, is hand built for the toughest job. The DB Series Pax II combines all the advantages of thoroughly proved automotive units into one chassis. Operators welcome the lower than usual operating costs made possible by the 5-1 litre diesel unit. The Dennis DB Series Pax II offers a choice of five wheelbases and is therefore a particularly attractive investment where unusual body-work is contemplated. Drivers, too, will find all the latest features of driving comfort incorporated in the cab to minimise driving fatigue. The Dennis DB Series Pax II is also available on low load tyres giving a low frame height of only 2 ft. 5 in.

DENNIS BROS LTD GUILDFORD



**198,000 MILES
IN 5 YEARS**

—and still no need for a re-bore

W. F. Miner & Sons operate a long distance haulage fleet based at Widecombe-in-the-Moor, Devon. Recently they examined their 7-ton type QX Commer which had run on Shell X-100 30 from new and had then 198,000 miles to its credit. When the sump was removed the crankcase and internal compartments were found to be so clean and free from sludge that the sump was replaced without any work being done. Next the cylinder head was removed and cylinder bore wear was measured and found to be less than 1/1,000 of an inch wear. "In five tough working years, the only repairs done to this vehicle were to replace three exhaust valves", comments Mr. Miner. "It proves the wisdom of using only Shell X-100 for petrol engined commercial vehicles run under arduous conditions".



FOR LONGER PETROL ENGINE LIFE

BUS TRANSPORT IN WEST PAKISTAN

Now Operated Under National Board

ROAD AND RAIL CO-ORDINATION PLANNED

ANNOUNCEMENT of the formation of the West Pakistan Transport Board on October 15, 1957, lends interest to the history of road passenger services in that province. Until 1955 Pakistan consisted of East Bengal, the four provinces of West Pakistan (Sind, Punjab, Baluchistan and the North West Frontier Province) and the Karachi Municipality which, as the country's capital, was not part of any province. At the time of partition in 1947 there was no organised transport system; privately-owned services of various degrees of efficiency were running in the cities and on some interurban routes, but legislation to authorise the nationalisation of transport already existed and the first publicly

in 1885, it is today operated by the Mohamedali Transport Company. There are 65 single-deck trams with Perkins P4 diesel engines and nearly 10 route-miles of line in the inner part of the city; in Karachi's wide streets a double tramtrack does not seem to hinder the flow of traffic. A frequent service is provided and at Sadar Bazar, the principal traffic centre, trams from the three "legs" reverse so that there is no through running from end to end of the system. The western "leg" terminates at the waterfront at Kiamari and has branches to Lawrence Road and Chakrawala. The tram and bus system was described in detail in our issue of July 23, 1955.

The tramway company is also associated with the Karachi Transport Syndicate, Limited, which operates buses on a number of routes and has put up roadside shelters bearing its name, though with-

angle of two roads and are whistled on not by a bus official but by a policeman. His concern is only with keeping the traffic moving, and there is apparently no timing or regulating at this point by the operators themselves.

Because of the multiplicity of operators it is not to be expected that Karachi's transport should set out to attract the stranger, or even should make available any factual publicity; but to judge from the small volume of complaints in the local press, the services meet reasonably well the needs of the citizens.

Lahore Services

By contrast, there has been a public local transport system in Lahore since September 28, 1945, when Lahore Omnibus Service came into being with a fleet of 30 buses on three routes as suc-

cessors to the privately-owned service of Mr. E. P. Nanda which had worked on three routes before the war. Additional services were soon started and the fleet grew to 50 vehicles by 1947 when the depot and workshops at Ferozepur Road were completed. By courtesy of Mian Iftikhar Ali, the district manager, we have been able to tour the recently extended workshops, where modern equipment for bus maintenance has been installed, and to obtain some information about the present-day activities of the Lahore Omnibus Service.

Although Lahore is only 33 miles from Amritsar in India, there is unfortunately no joint bus service across the border. On behalf of the Rehabilitation Department, L.O.S. operates vehicles as far as Jullundur, 65 miles beyond Amritsar, for the recovery of abducted women left in India, but the ordinary passenger has to change vehicles and walk across the border. The Lahore fleet also takes no part in long-distance services from that



Passenger transport in Karachi, the Pakistan capital: a Bedford diesel bus; one of the 65 Perkins-engined 4-ft. gauge tramcars; and, right, a Seddon bus with Perkins engine

owned service based in what is now Pakistan started between Rawalpindi and Srinagar on April 22, 1945.

Unhappily, 10 years after partition, Pakistan's refugee problem is still unsolved; in Karachi in particular, refugees living without shelter or in flimsy shacks number hundreds of thousands. Under these conditions the public services of the capital city cannot be taken as a model, and the road passenger transport is supplied by a motley collection of vehicles the details of whose operations are known only to their regular patrons—a striking contrast to the position in Lahore and Rawalpindi.

Karachi's Diesel Trains

However, if Karachi cannot boast a modern municipal transport system, it has a claim to fame in possessing a fleet of internal-combustion engined trams—said to be the only such vehicles in the world. Originally a British concern, launched

out any advertisement of its activities; however, this concern does not occupy a dominant position, most of the city buses being owned by small private operators. One of these, the Gujrat Bus Service, has the distinction of running Karachi's only double-deckers, and the fleet is finished in a green livery reminiscent of the small private operator in the U.K., with a device on the side panels including the fleet name; most other operators' vehicles are plain grey, with no indication of ownership except the "statutory" particulars on or near the front entrance.

Multiplicity of Operators

Each route has an officially allocated number, and as a particular vehicle usually spends all its running time on one route its bold route number indicators may be fixtures; a few buses carry also some indication in English of their destination but more usually the route details in Urdu are painted on the vehicle. There is a rather rudimentary "bus station" off Victoria Road, where the vehicles stop in turn at a platform in the

cessors to the privately-owned service of Mr. E. P. Nanda which had worked on three routes before the war. Additional services were soon started and the fleet grew to 50 vehicles by 1947 when the depot and workshops at Ferozepur Road were completed. By courtesy of Mian Iftikhar Ali, the district manager, we have been able to tour the recently extended workshops, where modern equipment for bus maintenance has been installed, and to obtain some information about the present-day activities of the Lahore Omnibus Service.

The fleet in October, 1957, consisted of 165 vehicles, all with diesel engines, serving a population of more than 1½ million people in Lahore and its suburbs. The buses covered 573 route-miles, operating some 21,000 bus-miles a day and carrying daily 110,000 passengers, there being no competition from private operators on the routes concerned. Besides the regular services there are excursions to places of interest and a special round-the-city tour at a fare of Rs.1/4/- (including light refreshments) operated by a luxury Tiger Cub bus with fans, radio and library.

city; the important link between Lahore and Rawalpindi along the Grand Trunk Road, for example, requires 24 vehicles, but these are all based at Rawalpindi.

Punjab Transport Service

Before the recent amalgamation L.O.S. was one of four units which together made up the Punjab Road Transport Board undertaking; this was constituted under the Motor Vehicles Amendment Act of 1951 and took over on April 15, 1952, the four units of the Government Transport Services based on Lahore, Rawalpindi, Lyallpur and Dera Ghazi Khan. The Board itself consisted of seven members (four representing the Provincial Government and three the State-owned railways) with a full-time chairman. The most senior of these, the P.T.S. Rawalpindi, started in 1945 with 25 hill-type buses and 30 trucks operating on the Rawalpindi—Srinagar route (mentioned earlier) as successor to the Jhelum Valley Transport Co., Limited, but competing with other concerns.

(To be continued)

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MONORAIL IN JAPAN

Trial Installation in Tokyo

AS part of its endeavours to find a solution for traffic congestion in Tokyo, now a city with a population of some 8,500,000, the Tokyo Metropolitan Government is examining the possibilities of overhead monorail systems. A 1,200-ft. trial line at Ueno was completed on October 14, 1957, and is now in operation. Built in the shape of a question mark, the line runs from one section of the Tokyo Zoological Gardens to another, crossing a road and a reserved track tramway on its way. It is to be opened to the public when trials are completed, but is regarded mainly as the pilot line for a possible much more extensive installation.

Construction

The running surface is formed in a shallow trough on the upper surface of a box girder built up from steel sections and sheet. This girder, or "running beam," is supported by pillars fabricated from sheet and angle steel. The pillars are in two sections, the lower section being vertical and the upper curved and tapered to give the whole pillar an inverted J shape. The 23 pillars and 22 lengths of running beam are welded throughout. The height of the pillars varies from 16 to 37 ft. to make allowances for the irregularity of the ground. The pillars are supported on concrete bases resting on piles.

Asphalt has been applied where steel and concrete would otherwise come into direct contact, and the running surface on top of the beam, formed in lightweight concrete, is similarly insulated from the steel trough in which it is formed. Extensive loading tests, using up to 400 gauges in a single test, have been applied to pillars and track. These tests show that the method of construction used gives a wide margin of safety.

The train is composed of two cars, each 30 ft. 6 in. in length and seating 31 passengers, with a tare of 6 tons. Each car hangs from two bogies, with two pneumatic-tyred running wheels, mounted in line, for each bogie. Two 30-kW electric motors drive each car, using direct current at 600 volts. Guide wheels, two at each end of the bogie and also fitted with pneumatic tyres, run on the side surfaces of the box girder and keep the running wheels to the centre of the track.

The frames of the cars are of monocoque construction and the bodies are sheathed in aluminium plate to reduce weight. Externally, the cars are of streamline finish with the outer ends, containing the driving positions, rounded into a smooth curve. To save weight, the cars have no lining, but the floors are finished in vinyl sheet. Non-inflammable materials are used throughout. The seats are arranged in rows of three, two on one side of the gangway and one on the other, except that there is only one seat opposite the door so that passengers have space to enter and leave the car more quickly.

Good View from Cars

The windows are of heat-resisting safety glass; they run along both sides of the car and round the driving end—which is not partitioned off from the saloon—giving a long sweep of glass broken only by narrow pillars. Passengers are thus assured of an exceptionally good view. The cars are hung by C-shaped supports from the centres of the bogies, extensive use of rubber being made in the suspension. Safety devices ensure that the cars will remain suspended from the track should

(Continued on page 19)



FREE on REQUEST

RAILCAR PROGRESS

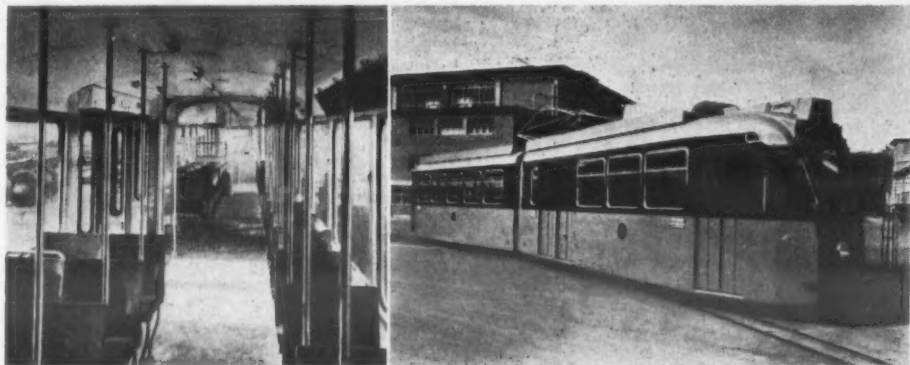
A Comprehensive Survey of Diesel Railway Workings in Great Britain, Northern Ireland and Eire, dealing particularly with the modernisation programme carried out by British Railways.

Modern Trams in Rotterdam

SWISS-BUILT CARS WITH BRITISH EQUIPMENT

ONE of the European cities which has continued vigorously to pursue its tramway development policy is Rotterdam, which, as described in MODERN TRANSPORT on a number of occasions, has taken particular care in its comprehensive postwar reconstruction programme to allow for the retention and, indeed, extension of tramway operations where advisable. Among the practical steps taken has been the introduction of

sets. The overall length of the tram and trailer is 26.9 metres (88 ft. 3 in.), the carrying capacity is 230 passengers, and the overall weight is 28,700 kg. (28 tons 5½ cwt.) It will be seen that while 33 fewer passengers are carried, there is a saving of 24 ft. 1 in. in overall length and of 9 tons 1½ cwt. in overall weight. With motors of the same power as in the earlier cars it will be realised that the enhanced power-to-weight ratio makes both for better



Interior and exterior views of one of the articulated tram sets built by Schindler for Rotterdam Electric Tramways

ultra-lightweight cars built by the Swiss firm of Schindler, A.G., Pratteln. These were delivered to the Rotterdam Electric Tramways in two forms, with 15 single-ended bogie cars and 14 articulated twin-car sets. It may, moreover, be recorded at this point that the electric motors for both types are of Metropolitan-Vickers manufacture.

The objects of the design were to obtain maximum safety of operation, reduced maintenance costs, maximum carrying capacity, rapid loading and unloading and ample room for passenger movement within the car, the best possible protection for travellers in bad weather, silence in operation, minimum overall weight, and an aesthetically

performance and for more economical operation.

The severe conditions of the winter of 1955-56 led to the inescapable conclusion that a comprehensive heating system must be provided and this has been done through a ventilation duct above the windows. The system embodies a Metropolitan-Vickers motored fan. Following the very satisfactory experience obtained with equipment in 34 earlier cars, the electro-magnetic braking system of this British manufacturer was employed for the new cars.

The single motor cars have two 50-kW Metropolitan-Vickers motors and like those in the articulated units these are geared for a maximum speed of



One of the single motor cars; it is hauling a trailer

pleasing design. Both types of tram have rear entrances with a seated conductor and central and front exits. Passenger capacity of the single cars is 123, seats being provided for 25, while 35 stand in the seating compartments and 63 in the centre and ends of the car. The articulated set seats 40 and allows for 45 passengers standing in these areas with a further 112 on the centre and end platforms.

Overall length of the articulated unit is 19.5 metres (64 ft. 2 in.) and that of the single car is 13 metres (42 ft. 7½ in.). The weight of the twin-car set is 19,500 kg. (19 tons 4½ cwt.) and this may be compared with the previous trams and trailers. These motor cars have four 50-kW power units which give the same total—200 kW—as the four Metropolitan Vickers units in the articulated

50 km.p.h. (31.25 m.p.h.). Other British suppliers include the E.N.V. Engineering Co., Limited, which provided the final drive unit of the hypoid gear type and the Laycock Engineering Co., Limited, which was responsible for the Layrub flexible couplings. The Tudor batteries are charged by a C.A.V. battery charger. Steel is employed in the construction of the cars with 1.75 mm. (.0689 in.) sheet used for the upper part of the sides and 3 mm. (.118 in.) steel plate for the lower part. The design of the articulated units owes a good deal to a combination of the features of the sets used in considerable numbers in Rome and Milan and those of the ultra-light trams in service in Basle. The coupling of the articulated set with the moving floor in the connecting section was evolved by Sr. Urbinati of the S.T.E.F.E.R. undertaking.

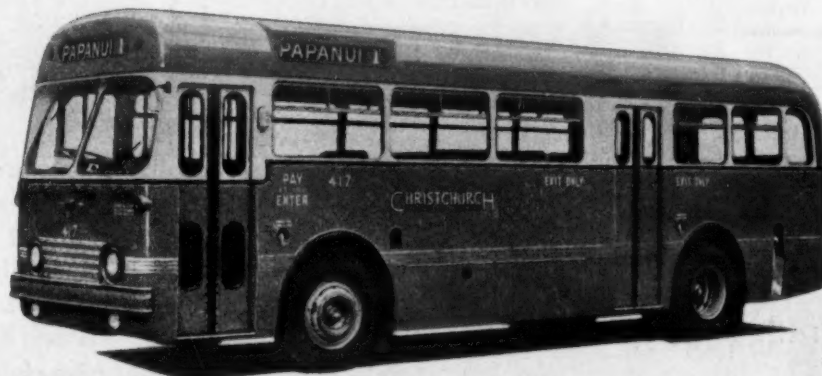


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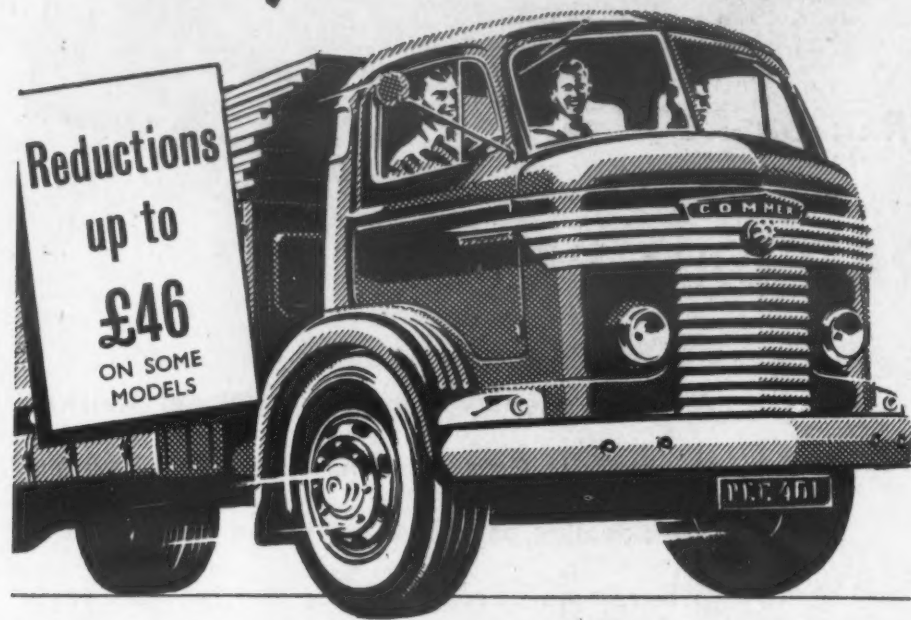
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NEWS FROM ALL QUARTERS

Japanese Road Tunnel

A 2½-mile double-deck road and pedestrian tunnel under the sea between the Japanese islands of Honshu and Kyushu has been completed. The Kanmon Tunnel has taken 21 years to build—work was suspended during the war—and cost about £5½ million.

Underground for Kiev

Plans have been drawn up for an underground railway in Kiev, the capital of the Ukraine. This would be the third in the U.S.S.R., the other two being in Moscow and in Leningrad. The first section, in Kiev, 5½ miles long, will link the city's main industrial district with the River Dnieper and will have seven stations.

Weekly Rover Tickets for Any Period

Holiday season tickets to be known as "Rail Rovers," available for any seven consecutive days between April 1 and October 31 this year, will be introduced by the Eastern and North Eastern Regions. These tickets will be available either within a single region or in both. The North Eastern Region ticket costs £5 second class, the Eastern Region ticket £6 and the combined ticket for both regions £9. These tickets will be available on excursion trains.

Agency Department for Thomas Cook

In order to combine the activities of Thomas Cook and Son, Limited, and Dean and Dawson, Limited, in their dealings with appointed booking agents, Thomas Cook has created a new department, to be known as the agent's department. This very important source of business had increased by half, and it is now about to be increased to double its original size in order to deal with bookings from sub-agents in all parts of Great Britain.

Dee Road Bridge

The Minister of Transport has intimated that he is prepared to authorise the £100,000 scheme for a new bridge to cross the River Dee at Queensferry, the source of considerable congestion during the summer months to road traffic between Lancashire and Cheshire and North Wales. The scheme will involve a 2½-mile by-pass for Queensferry. This road will have dual carriageways each 24 ft. wide, while the new bridge will have an 80-ft. overall width.

Festiniog Railway Trip

On April 26 a special train organised by the Festiniog Railway Society in connection with its annual general meeting and hauled by the former G.W.R. *City of Truro*, will leave Paddington at 7.40 a.m. (returning Sunday 7.08 a.m.) for Portmadoc, calling at High Wycombe, Birmingham, Wolverhampton, Shrewsbury and Ruabon. At Portmadoc the Festiniog Railway workshops will be open for inspection and a special train service will enable those who so wish to travel behind *Talisin*, the double-Fairlie locomotive, to Tan-y-Bwlch, to which point it is expected the line will then be open. Details may be had from Mr. J. B. White, 129 Cannonbury Avenue, Pinner.

Chichester Harbour Improvement

A West Sussex agricultural merchant business which has held the lease of Dell Quay, Chichester, since 1911 has applied to Chichester City Council for a further 99 years' lease with the intention of restoring the quay and providing it with modern machinery ready for a revival of trade. Expenditure will be in the region of £10,000.

Car Sleeper Express Lengthened

Although the period of operation of the Boulogne—Lyon car sleeper express of French Railways has been extended and its frequency doubled for next summer (six days a week instead of three) the advance bookings on this popular service have been such that it has already been decided to add a fourth wagon-lits to the train. The passenger section of this train will thus have a total accommodation of 331 sleeping berths, with space for 95 cars.

Gateshead—Felling By-Pass

The Gateshead—Felling by-pass, a scheme estimated to cost more than £1½ million, is to be started soon. From the southern approaches of the Tyne Bridge, it will run in a south-easterly direction for nearly three miles between the Tyne and Sunderland Road, to join the Newcastle—Sunderland trunk road (A184) at High Lane, Heworth. It will have two 24-ft. carriageways, divided by a central reservation, and footpaths on each side. There will be 10-ft. wide bays at bus stops where buses can draw in without holding up traffic.

A London Parking Fantasy

Its five-storey parking garage near Piccadilly Circus, capable of holding 185 cars, has had space for many months for an additional 85 vehicles over and above the space utilised by private motorists and a fleet of self-drive cars, states Ryans Car Hire, Limited. Despite this, surrounding streets, such as Jermyn Street—officially no parking—are daily packed with cars, it says. Moreover, London County Council will not permit the company to use the garage for any other purpose than parking. It has turned down numerous applications to provide storage or warehousing facilities, because cars remain parked in nearby streets.

Clearance of Imported Vehicles

For 50 years the Automobile Association has handled the formalities and organisation necessary to allow members to bring their cars from overseas to the United Kingdom, but with the increase in this traffic it has now appointed Lep Transport, Limited, agent to carry out this function for members. Lep Transport will therefore take over the very involved documentation required before H.M. Customs and Excise officials are satisfied and allow the vehicle to clear the port of entry. It has opened a new section to deal exclusively with the problems of importation, insurance, registration, Customs clearance, bonded accommodation and servicing to comply with U.K. Road Traffic Acts as well as oil changes for climatic variation.



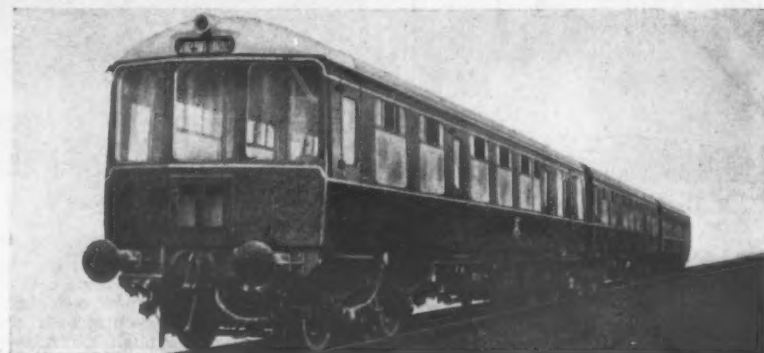
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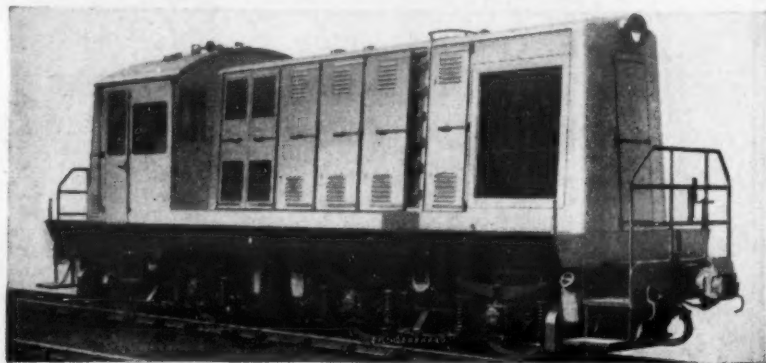
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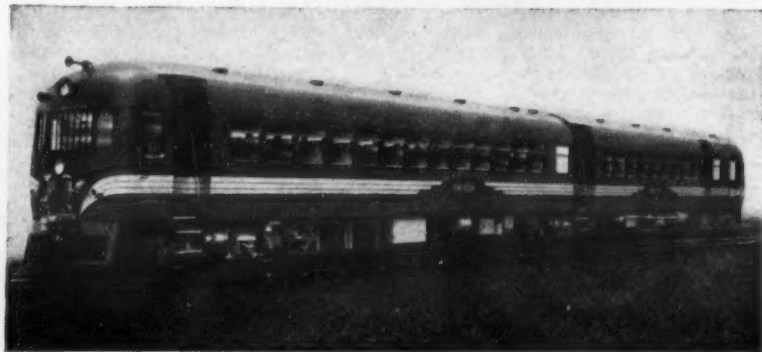
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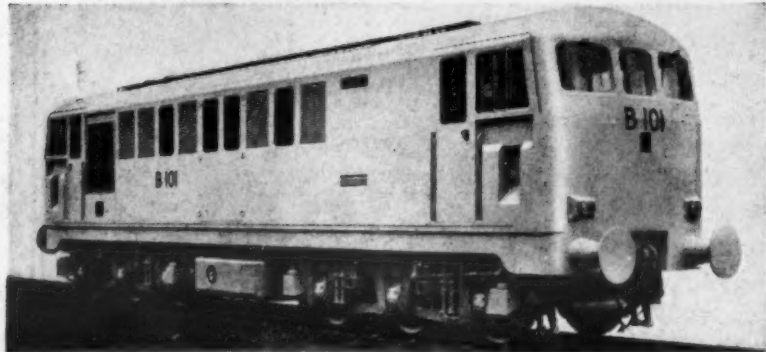
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Diesel Mechanical
Railcars

In collaboration with
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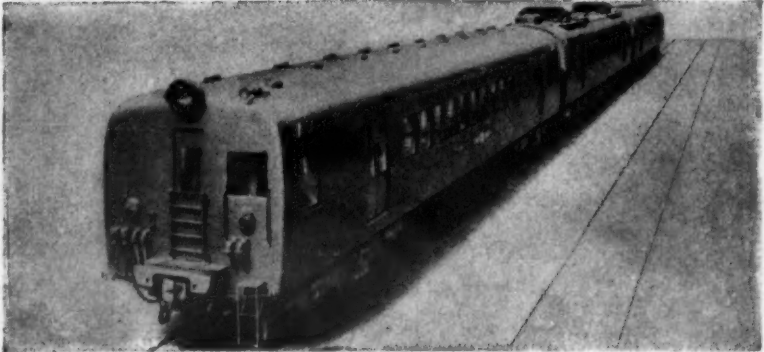


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Dart Completes 4,000,000 Hr.

SUCCESS OF T.A.A.

THE Rolls-Royce Dart, the world's first commercial propjet engine, has now flown more than four million revenue hours powering the Vickers Viscount on world air routes. The Dart-powered Vickers Viscount first went into regular service nearly five years ago with British European Airways. Today more than 250 Viscounts are in service with 29 airlines and six other operators. For nearly four years the Rolls-Royce Dart was the only propjet in airline service. More than 2,000 engines have been built and delivered, and as a result Rolls-Royce have accumulated a wealth of experience of civil gas turbine operation. A main feature of this experience is the large number of hours accumulated on single components which, in a number of cases, exceeds 5,000 hr. Rolls-Royce experience with engines in military service indicates that in military operations engine parts are seldom exposed to the intensive utilisation of airline service, and thus rarely reach lives of this magnitude. The Dart started service at an overhaul life of 400 hr. and within 18 months the Air Registration Board extended the life to 1,050 hr. This was achieved at a time when the Dart was the only gas turbine in airline service. Since then the overhaul life has gradually been extended and lives of up to 1,800 hr. have been approved, and engines have been run to over 2,000 hr. on a trial basis with a view to a further extension of the overhaul life. The success of the Dart in the Vickers Viscounts and its power development whilst maintaining reliability have led other airframe manufacturers to adopt the Dart for their new designs. The Fokker Friendship, which is also being built under licence in the U.S.A. by the Fairchild Airplane Corporation, is powered by two Darts.

Silver City Forced to Modify Rates

Silver City Airways has amended car rates on the Lydd—Ostend air ferry which will apply from April 1 until September 30. Its original rates were the subject of a protest by Sabena, which operates in association with Air Charter on the Southend—Ostend route.

New Nairobi Airport

Owing to H.M. the Queen Mother being delayed in Mauritius by the engine trouble of the Qantas Lockheed Super-Constellation in which she was flying, the formal opening of the new Nairobi airport at Embakasi was carried out a day late—on March 9—by Sir Evelyn Baring, Governor of Kenya.

Economy Tours by B.O.A.C.

Based on the new economy-class Atlantic fare which, subject to Government approval, will come into effect on April 1, four-week tours of Europe are being offered by the British Overseas Airways Corporation in the U.S.A. The tours, which will cover England, France, Holland, Belgium, Germany, Switzerland, Liechtenstein, Austria, Italy, Monaco, will leave New York every Sunday from April to the end of October. The cost, including round-trip Atlantic tickets, hotel accommodation, two meals daily, travel in Europe by train or motor coach and the services of a courier escort, will be £327 17s. 2d. The tours are being arranged in conjunction with Lansear Travel Service Inc.

Special Atlantic Cargo Rates

Scheduled transatlantic airlines are proposing to reinstate special rates for mixed consignments of cargo, it has been announced by the International Air Transport Association traffic conference office in New York. The new rules are being submitted to a statutory mail vote of all I.A.T.A. carriers concerned. If approved by them and by interested governments, they will become effective on April 15 for the remainder of the traffic year ending March 31, 1959. Mr. E. S. Pefanis, secretary of the I.A.T.A. conference, said that under the new rules, mixed consignments weighing 100 kg. or more and wholly made up of commodities eligible for specific commodity rates would be charged at 40 per cent less than the normal general cargo rate for shipments under 45 kg.

Viscount Success With T.A.A.

The 11 Vickers Viscount turboprop air liners of Trans-Australia Airlines carried 560,000 of T.A.A.'s record total number of 811,977 passengers in the calendar year 1957. This overall figure was a 5 per cent increase on that for 1956 when a total of 773,144 passengers was carried. The average passenger journey was 485 miles. The assistant general manager of T.A.A., Captain John Chapman, stated that the record figures reflected the ever-increasing popularity of air travel and the continued strong appeal of the Viscounts. T.A.A. Viscounts now hold 28 of the 29 civil air speed route records for major Australian domestic routes. The last financial statement issued by T.A.A. (for the year ended June 30, 1957) showed a net operating profit of nearly £A300,000. A dividend of 5 per cent was paid to the Australian Treasury. T.A.A. will take delivery of two further Viscounts in the summer of this year. These aircraft will offer increases in payload, and other improvements. The fitting of low-pressure tyres and non-skid brakes will enable Viscount services to be extended to many airports which are not on current schedules. The original 11 aircraft are progressively to be modified to the same standards.

Activity at British Aerodromes

Air transport movements at United Kingdom aerodromes numbered 18,046 in December, 1957, or 6 per cent more than in December, 1956. This brought the total for the year up to 328,698, an increase of 7 per cent on 1956. Passenger traffic in December was 338,929, an increase of 6 per cent over the previous year and the total for 1957 was almost 7 million, an increase of one million, or 15½ per cent, over 1956. Freight traffic in 1957 amounted to 153,382 short tons. This figure includes the weight of vehicles carried on vehicle ferry services and was depressed slightly by petrol rationing at the beginning of the year. The increase over 1956 was 4 per cent. Post Office mail picked up and set down during 1957 totalled 18,196 short tons. London Airport handled 3,513,443 passengers in 1957, 15 per cent more than in 1956, and there were 116,101 air transport movements, an increase of 6½ per cent. Southend Airport showed the greatest increase in passenger traffic during 1957 with an increase of 78 per cent to 139,276 passengers. Other large increases in passengers were Bristol, 39 per cent to 44,118, Lympne 31 per cent to 60,108, Southampton Water 31 per cent to 15,784, Blackpool 29 per cent to 58,860, Liverpool 23 per cent to 150,100 and Manchester (Ringway) 23 per cent to 478,062.

A WELL-KNOWN MOTIVE POWER OFFICER



The late Colonel H. RUDGARD, O.B.E., T.D.,
M.I.Mech.E., M.I.Loco.E., M.Inst.T.

Described on his retirement as one of the Railway Executive's most popular and experienced officers, Colonel Harold Rudgard, whose death we regret to record on another page, began in 1901 as a pupil under Samuel Waite Johnson, locomotive superintendent of the former Midland Railway. After passing through the shops and gaining footplate experience, he worked in the drawing office; later he was successively district locomotive superintendent at Skipton, Derby and Plaistow. Joining the Territorial Army in 1914, he served for 20 months in the trenches until transferred to the Royal Engineers, Light Railway Section. He became Superintendent of Light Railways, 4th Army, and afterwards commanded workshops at Beaurianville and the B.E.F. carriage and wagon depot at Audruicq. He retired from the Army in 1919 with the rank of lieutenant-colonel and in 1925 was gazetted lieutenant-colonel, Land Forces, being called up on mobilisation in 1939. Authority being obtained for his retention in railway service, he was gazetted major in the Royal Engineers (Engineer and Railway Staff Corps) on February 1, 1944. Returning to his railway career, in 1919 he was appointed assistant superintendent of freight trains, Midland Railway, Derby, and, on grouping, was made assistant to the motive power superintendent, L.M.S.R., Derby. In 1932 he became divisional superintendent of motive power (Midland Division), and in 1935 assistant divisional superintendent of operation, Derby; he was appointed divisional superintendent of operation there two years later. Under Mr. Rudgard's leadership the Midland Division won the express passenger train competition for 1938, carrying with it the Byrom Cup, and also the 1938 divisional freight train competition. He was appointed superintendent of motive power in December, 1942, and became chief officer (motive power) following the setting up of the Railway Executive in October, 1947. He retired after 50 years of railway service on December 9, 1950, and greatly enjoyed the bowler hat, decorated with Stephenson's "Rocket," presented to him by his friends. During the 1939-45 war he served as liaison officer with the Midland (Amalgamated) District Coal Mines Scheme. He was president of the Institution of Locomotive Engineers in 1948-49. During the past two years he has been associated with the revival of the 1 ft. 11½ in. gauge Festiniog Railway as chairman of the Festiniog Railway Society, Limited.

IN PARLIAMENT

Buscs Registered as Cars

NEXT P.S.V. REPORTS SOONER

WAS he aware that an increasing number of firms was registering passenger-carrying vehicles with 12 or more seats as private cars to transport their employees without charging fares, Mr. ERNEST DAVIES asked the Joint Parliamentary Secretary to the Ministry of Transport. They were, he said, thereby avoiding the public safety provisions of section 19 of the Road Traffic Act, 1930, relating to hours of work and rest periods and also the Conditions of Fitness Regulations. What steps did he propose to take to end this anomaly? Mr. G. R. H. NUGENT agreed that such vehicles were outside the statutory provisions. There was no power to include them, nor any evidence that they constituted a danger. They operated under quite different conditions, he claimed, to public service vehicles run for hire or reward. Generally speaking, they plied for short distances only morning and evening.

School Travel Concessions Bill

The private members Bill to enable local authorities to grant to schoolchildren new travel concessions, presented by Mr. NORMAN PANNELL, was read the first time in the Commons on March 4 and is down for second reading on May 2.

Compulsory Vehicle Tests

Compulsory tests for cars and commercial vehicles not exceeding 30 cwt. unladen will apply initially to those first registered 10 years or more before the date on which the scheme is introduced, the Minister of Transport announced last week. The fee for testing both classes of vehicle will be 15s., of which 1s. will go to the M.O.T. Applications from firms ready to be appointed as authorised testing stations will be sought in April, it is hoped, but no date is announced for the introduction of compulsory tests.

P.S.V. Reports for 1956-57

Admitting that, "due to pressure of work," publication of the 1955-56 annual summaries of the reports of area traffic commissioners for public service vehicles had been delayed last year, the Minister of Transport said that the summaries for 1956-57 would be ready shortly. Future issues would be published as quickly as possible. Mr. ERNEST DAVIES, his questioner, suggested that "very valuable information can be gleaned from these reports, particularly with reference to the servicing of rural areas."

British-Owned Ore Carriers

Mr. GEORGE STRAUSS asked the Paymaster-General how many ore-carrying ships, and of what tonnage, are now owned by the Iron and Steel Federation for carrying ore for the iron and steel industry. SIR IAN HOROBIN, in a written reply, said that the British Iron and Steel Federation does not itself own ships but its wholly-owned subsidiary, the British Iron and Steel Corporation (Ore), Limited, which arranges the chartering of ships, has a financial interest in seven companies formed to buy and operate ore-carriers. The companies have ordered a total of 31 ships.

TRIBUTES TO C. K. BIRD

London Memorial Service

A MEMORIAL service to Mr. C. K. Bird, late general manager of the Eastern Region of British Railways, was held on Friday, March 7, at the Church of St. Botolph, Bishopsgate, E.C.2. The service was conducted by the rector, the Rev. Prebendary H. H. Treacher and the choir was formed by a section of the Eastern Region Musical Society with Mr. A. T. S. Rayner, regional welfare officer, at the organ. The rector said that all who knew Mr. Bird realised he was one of the finest of men—his breadth of vision, instant understanding, clarity of thought, sense of humour and kindness brought him affection as well as respect. He had only just retired from the railway service and the anxiety over his health during the past year or two had been a real grief to those who knew him in his full vigour. His death in St. Bartholomew's Hospital came none the less as a great shock to everyone.

In addition to the widow and members of the family, the service was attended by the chairman of the British Transport Commission, Sir Brian Robertson, and Lady Robertson; the deputy chairman, Sir John Benstead; the chairman of the Eastern Area Board, Sir Reginald Wilson; the newly appointed general manager of the Eastern Region, Mr. H. C. Johnson, who read the lesson, together with a representative gathering of officers and staff from all branches of the railway and transport world.

A Tribute

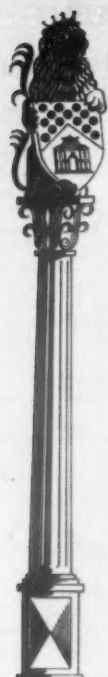
For 10 years after British Railways were nationalised, C. K. Bird guided the Eastern Region through a difficult era of transition. Unhappily his health failed when the need for his leadership was greatest, but with the help of a loyal band of colleagues he kept the regional operations at a high level until he left office at the end of January. His example should be an inspiration to the younger railwaymen who are left to carry on.

Hailing from Corby in the south-west corner of Lincolnshire, C. K. B. showed at St. John's College, Cambridge, that he had a bent for mathematics, though he never lost the liking for the classics implanted in him at King's School, Grantham. He also served in the 1914-18 war and then went to the North Eastern Railway as a traffic apprentice, gaining a knowledge of railway work at York, Newcastle, Leeds and Middlesbrough.

Preparation

His opportunity came when he was offered a post in the chief general manager's office of the London and North Eastern Railway in 1928. In a short time he had the advantage of dealing with questions of passenger fares, freight rates and statistics of all kinds under the supervision of Sir Ralph Wedgwood. That was a fine preparation for becoming in turn rates assistant to the goods manager, Southern Area, assistant to the divisional general manager of that area and, finally, chief regional officer in 1948.

The steady progress of the Eastern Region in the last 10 years is apparent from its operating statistics. The improvement in results was due largely to C. K. Bird's quiet persistence and sound judgment. He handled difficult situations tactfully and was scrupulously fair in his relations with the staff of all grades. His calm manner of going about his business was a likeable trait winning for him the affection of his assistants and the esteem of all who had dealings with him.—R. B.



Abroad view

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SOUTH AFRICAN RAILWAYS

Results for 1956-57

IN its annual report for the year ended March 31, 1957, the South African Railways and Harbours Administration includes a review of the progress of the railway and other services during the past decade, marking 1946 as the effective starting point for the postwar major works programme.

During the year under review the operation of all services resulted in a deficit of £2,130,980, after allowing for appropriations from revenue of £5,000,000 towards the betterment fund and £1,200,000 as a special contribution to the renewals fund. The surplus quoted contrasted with a surplus of £2,786,982 in the previous year, when there was in addition a contribution of £3,500,000 towards reduction of interest bearing capital and the special contribution towards renewals was £2,919,000.

Railway operations resulted in a net revenue surplus of £808,805 (£10,476,204), harbours £2,310,088 (£2,568,948), steamships £170,842 (£98,523) and airways £839,285 (£1,122,307). The road transport services, passenger and goods, are subsumed in the railway figures; there was a loss on working here of £403,540, compared with £237,285.

With the exception of passengers and coal, revenue under all heads increased and at £91,531,809 for freight (excluding coal) was a new record. Passengers carried increased by 5,630,000, but while long-distance passengers declined by 630,337, short-distance passengers were more numerous by 6,260,340. Revenue declined slightly. Transfer of the Alberton road services to Alberton Municipality is recorded; overall, the numbers of third-class passengers carried on the road services increased despite competition from other operators.

Modernisation Labours

The modernisation programme entered upon in order to expand the carrying capacity of the railways is as a whole ahead of schedule but comparatively few of the new facilities became available during 1956-57. Work on the Natal main line, for example, has reached the stage when progress with doubling and realignment of track produces unavoidable bottlenecks. Moreover, there is still insufficient motive power to make use of increased track capacity because this was an interim period during which the railways administration had far-reaching proposals for electrification to be decided, while the extent to which diesel traction should be introduced had still to be determined.

A number of electric locomotives was introduced into service, but on main lines where they could not be employed to full advantage, and their introduction did not balance the decline in steam traction. All these things, plus the fact that comparatively few new freight wagons were received, limited the increase in actual freight tonnage hauled to 0.60 per cent over the previous year. In fact, S.A.R. had to enlist the aid of road hauliers to move 2,500,000 tons of coal from the Transvaal mines to the Witwatersrand and Pretoria in order that other traffics could share the limited

wagon and motive power capacity available.

A statement by the South African Minister of Transport in February referred to the proposed design and ordering of rolling stock for electrified services and associated matters. He indicated that sliding door stock would be ordered for the electrified lines in the Western Cape and it was expected that an order for 394 coaches would be sanctioned this year. The new stock would be reserved for European passengers and the present stock would be turned over for non-European use. This procedure would also be followed for certain Natal and Transvaal services.

New Coaching Stock Orders

During the financial year commencing April 1, 1958, orders would probably be placed for 75 first-class electric driving trailer coaches; 119 first-class trailers; 71 first- and second-class trailers; 27 third-class trailers; 51 third-class motor coaches; 51 first-class and van motor coaches; 12 electric motor parcels vans; and four first-, second- and third-class and van steam suburban coaches. Current schedules provided for the acquisition of 120 motor coaches and 284 trailer coaches for the Reef electrified services. Of these, 105 motor and 244 plain trailers were in the course of delivery; tenders had still to be invited for the balance, which were intended for the Germiston and Bank European train sets. These coaches were also of the sliding-door type and as they came into service stock now used on the European electrified services would be released for Western and Eastern Transvaal non-European electrified services necessitated by the schemes for the resettlement of the natives.

Of these 349 vehicles, 70 motors and 123 trailers are being constructed by the Metropolitan-Cammell Carriage and Wagon Co., Limited, at Washwood Heath, as main contractor (see page 3), while the remainder have been entrusted to the Birmingham Railway Carriage and Wagon Co., Limited, Smethwick. The sub-contractor for all main electrical items of all coaches is the Metropolitan-Vickers Electrical Co., Limited, Trafford Park, Manchester.

The Minister's statement indicated that there would also be acquired 30 motor and 90 trailer coaches for the Cape suburban European and mixed services; these had not yet been ordered. An extra 30 motors and 80 trailers would be needed for the new non-European services that would result from the schemes for the resettlement of natives in the Western Cape and a similar policy to that noted above would be followed. When the 394 new coaches which it was proposed to order for the Cape were received, 447 coaches now used on the Cape suburban electrified services would become spare. It was intended to retain 230 of them on the Cape Western system for the Nyanga, suburban and Wellington services. The remaining 217 would be used for the Natal and Kaalfontein (Transvaal) non-European services. Nine twin air-conditioned dining-cars were at present on order for delivery between June and August, and it was intended to acquire 10 additional cars of this type annually.



Latest addition to Pressed Steel Company Limited British Railways production: new 58 ft. gangwayed Standard Brakevan.

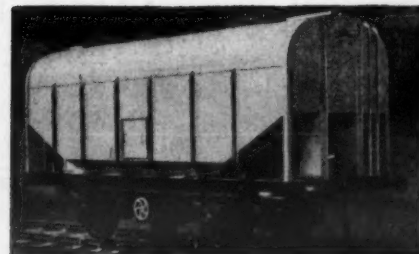
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U.S. DIESEL RAILCAR DEVELOPMENTS

Success in Stemming Traffic Recession

USE OF HYDRAULIC TRANSMISSION

TO the general association in the United States of electrical transmission with diesel locomotive power there has during the past nine years been one notable exception. This is the diesel-hydraulic Budd RDC railcar, which because of its economical performance is growing steadily in popularity. It is being used, not merely as a single unit for branch and subsidiary main-line passenger work, but also assembled into trains of from two to six units coupled, with multiple-unit control, for services ranging from outer suburban commuters' trains to long-distance main-line trains with restaurant facilities. Recently Mr. E. S. Rupp, assistant to the vice-president, operating and maintenance, Baltimore and Ohio Railroad, has made public the experience of his railway with RDC cars in these varied categories,

suburban route 17.6 miles long which was used heavily by commuters, but which was being operated uneconomically by steam power and was losing traffic steadily. As a result of the experience in the Washington area, three RDC-1 cars were obtained in 1953, and after an extensive publicity campaign were put in service in April of that year on accelerated schedules. The result again was a cut of 50 per cent in operating expenses, coupled with an increase of 30 per cent in passenger patronage.

Long-distance Work

In the same year the decision was reached to dieselise the Baltimore division entirely, over the 181.7 miles from Philadelphia through Baltimore and Washington to Brunswick, Maryland. The



Budd RDC diesel-hydraulic railcar set in Canadian Pacific service crossing the Nith River bridge at Ayr, Ontario, en route from Toronto to Detroit

showing their possibilities in simultaneously cutting working expenses and attracting additional passenger patronage.

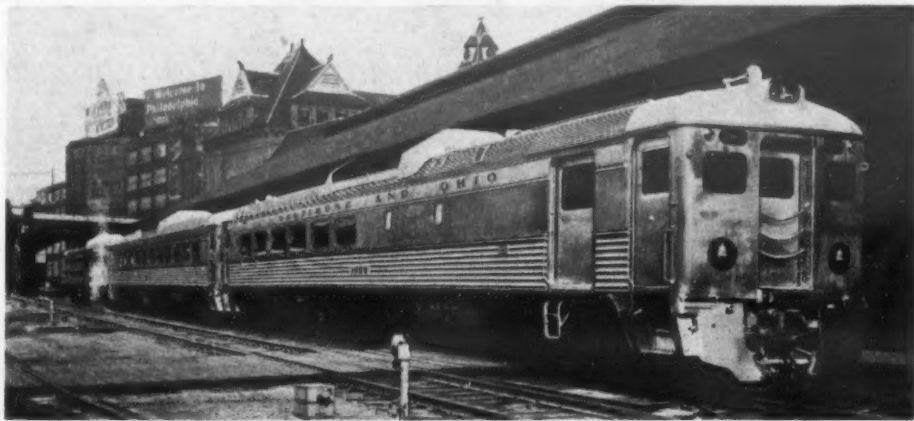
The standard Budd-built RDC car, 85 ft. long, is driven by two six-cylinder diesel engines; in the original cars, introduced in 1949, these were of 275 h.p. each, giving a total of 550 h.p. per car, but in the later models the engines are of 300 h.p., or 600 h.p. per car. Power is delivered through a torque-converter transmission and Spicer drive to the inner axle of each four-wheel bogie. The two compact power-plants are mounted below the car floor, together with the fuel and water tanks and auxiliary equipment, while the cooling radiators and engine exhaust pipes are housed in a dome above the roof, apart from two small driving compartments, which occupy half the car width at each end, the whole length of each car thus is available for revenue purposes.

Four Types

Four types of this car have been developed. The RDC-1 is an all-passenger coach; RDC-2 is divided between passenger and baggage space; RDC-3 is a combination passenger, mail and baggage car; while RDC-4 is adapted for mail and baggage conveyance only. A recent development is RDC-5, for passengers only and seating 94; this has no driving compartments and a single 300-h.p. engine only. It is intended for service coupled between two of the standard twin-engine cars, where 1,500 h.p. will be ample for the propulsion of the complete train. The standard 600-h.p. cars

long-distance trains and two of the local trains in each direction would still require locomotive haulage, owing to their mail, baggage and express requirements, but it was decided to use RDC cars for all the remaining workings. For this purpose three RDC-1 and two RDC-2 cars were ordered to supplement the two RDC-1 cars already working in the area, and these were delivered in September, 1953. The seven cars from then on were rostered to make 24 trips, with a total mileage of 914 each day. Between St. Denis (Baltimore) and Washington many of the Speedliner services are scheduled in 31 min. for the 30.1 miles, including a stop at Laurel.

By one of the curious operating rules governing the relations between American railways and the men's unions, these cars have to carry a fireman as well as a driver because the weight on the driving wheels of each car exceeds 90,000 lb. (40 tons). A flagman is carried to supervise the loading and unloading of passengers and baggage at each intermediate stop, and to provide flag protection for the train if necessary, leaving the conductor free to attend to tickets on the short point-to-point runs. This means a total crew of four on each train, although on other lines a crew of three only is required on single car runs. Despite this handicap, however, on all these local services of the Baltimore and Ohio that are worked by RDC cars the reduction in the cost per mile in respect of wages has been 42 per cent, fuel 70 per cent, water, lubricants and supplies 19 per cent and repairs 35 per cent, making an all-over reduc-



Baltimore and Ohio Railroad "Daylight Speedliner" on the Philadelphia-Washington-Pittsburgh service made up of three RDC diesel-hydraulic railcars

are capable of accelerating to 60 m.p.h. in just over 2 min. from a standing start and can easily maintain schedules timed at over 60 m.p.h. from start to stop on short runs; their maximum rated speed is 85 m.p.h., which can be reached in 8 min. on level track from a start.

The Baltimore and Ohio experiments with RDC cars began in 1950. The railway was losing money on its intercity service over the 38.3 miles between Baltimore and Washington, chiefly owing to the light patronage of the trains during the midday period, though they were well filled in the morning and evening rush hours. The Budd Company loaned to the B. and O. two cars, an RDC-1 and an RDC-2, which proved so satisfactory in operation on this service that two RDC-1 cars were ordered by the railway, and were delivered in December, 1950. By mid-January, 1951, these were working as a two-car train on two round trips in each direction between Baltimore and Washington, with morning and evening runs over the 50 miles between Washington and Brunswick, a total of 246 miles daily.

Economy

After 12 months' working it was shown that there had been an operating economy of 51 per cent, as compared with the cost of working the conventional steam trains that the cars had displaced; also over this period the cars had been available for their assignments for 95 per cent of the year. The title of Speedliners was applied to these services and those introduced subsequently.

Attention was directed next to the service between Pittsburgh, McKeesport and Versailles, a

tion of 43 per cent. The increase in passenger patronage on all routes concerned has averaged 22 per cent.

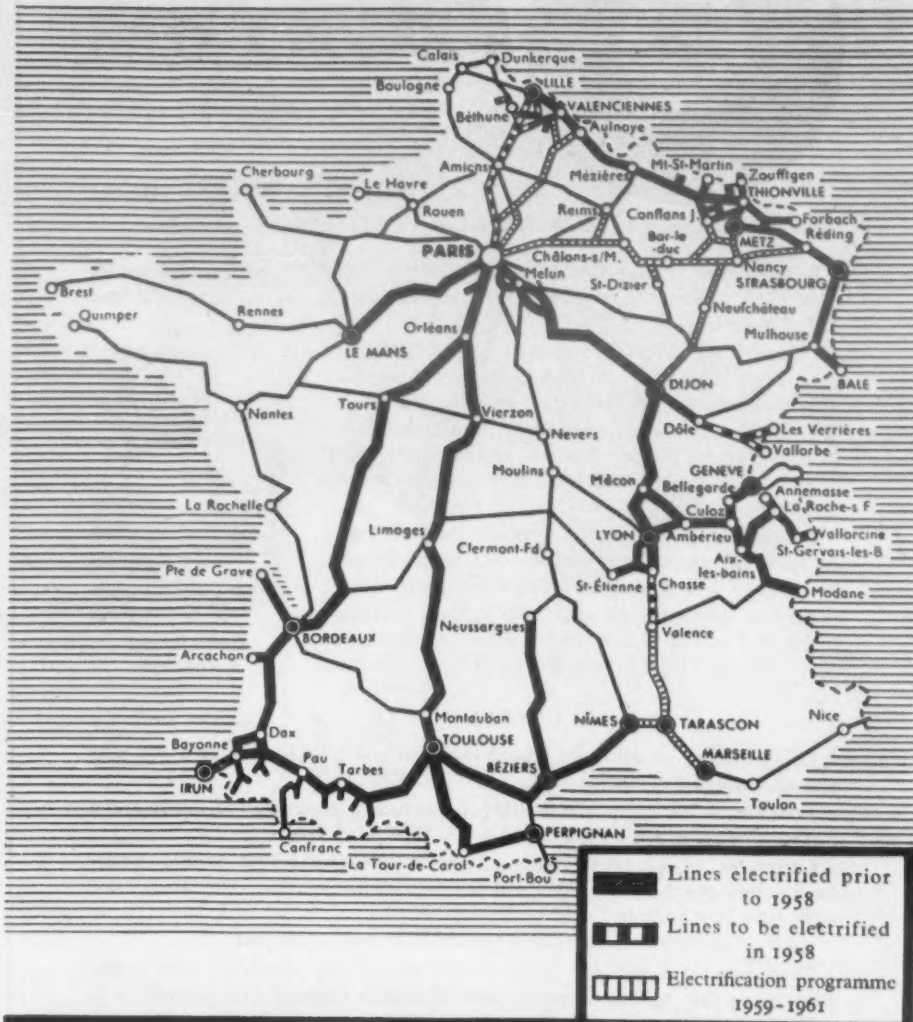
A 768-mile Journey

During 1954, the B. and O.R.R. became interested in the possibilities of lightweight equipment for fast long-distance runs as a means both of making passenger travel more attractive and of cutting working costs, and joined with five other railways in appointing a committee to examine the matter. Various types of car and train of revolutionary design were examined, but the B. and O. did not feel that any of them suited its own requirements; it was thought that needs might best be met by a development of the RDC design. An experiment was therefore made in 1955 on a special railfan trip arranged for the National Railway Historical Society from Washington to Chicago and back on the Memorial Day weekend of that year. A three-car train comprising one RDC-2 and two RDC-1 cars were made up from the Baltimore Division pool, and a special schedule was drawn up for the 768-mile run, 2½-hr. faster than that of the Capitol Limited, the fastest regular train on the service.

Actually in running the latter's schedule was cut by roughly 3 hr., the time taken by the RDC train being 12 hr. 29 min., which entailed an overall average of 61.4 m.p.h., stops included. At the eastern end of the run there are long and very steep gradients through the Allegheny Mountains, with a summit level of 2,258 ft. above the sea, approached by continuous 1 in 80 gradients. Over

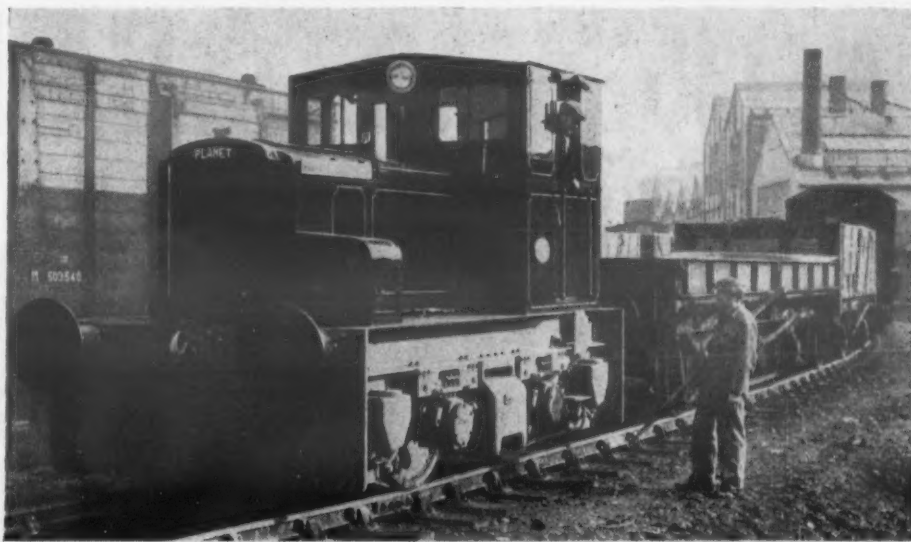
(Continued on page 20)

ELECTRIC TRACTION IN FRANCE



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COMPANY MEETING



A RECORD YEAR

Mr. E. R. Lewis (Chairman) at the Annual General Meeting of The Decca Record Company Limited:

Balance from Trading Account for the year to March 31, 1957, amounted to £2,389,368, an increase of £590,445, the highest ever achieved. Net Profit was £581,206 against £450,294.

Consolidated turnover increased by £4,190,000 to more than £17 million, a remarkable expansion since 1947 when the comparable figure was £1,289,000.

Production and sales of records were greater than in any previous period, production amounting to 30 million records out of a total of 70 million for the industry.

Decca Navigator made further progress with considerable extensions in hirings. The North Scottish Navigator Chain had been brought into operation.

Exports amounted to over £4½ million, including £1,300,000 to the U.S.A. and Canada, equivalent to about one day's total British exports to those countries.



Record Players & Television

CURRENT YEAR

Group output to date was considerably greater than for the previous year and all sections had participated.

Four Decca Navigator transmitting chains had been erected in Canada and a further chain was being constructed in the New York area.

Orders for marine radar continued satisfactory, Decca True Motion Radar having been purchased by over 150 shipping companies and more than 7,000 ships were now equipped with conventional radar.

Sales of television receivers were greatly in excess of last year.

There was no doubt that results for the year ending March 31, 1958, would show a marked increase in profits and he looked forward with confidence to the future of their great enterprise.

The Report was adopted and the total dividend of 1s. 9d. for the year approved.



Navigational & Radar Aids

DECCA

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COMMERCIAL VEHICLE TEST

Austin Gipsy ½-Ton Utility*

FOUR-WHEEL DRIVE AND INDEPENDENT SUSPENSION

DESTINED to find useful employment in many odd corners of the world, particularly where the going is rough and tough, as well as in this country, the new Austin Gipsy utility vehicle appears likely to prove virtually unbreakable and unstoppable. The Gipsy, which we described in detail in our issue for March 1, is offered with alternative petrol or diesel engine of adequate power to give a high road and cross-country performance, has disengageable four-wheel drive and auxiliary low gear ratios and is notable for being the first powered vehicle to employ the Spencer Moulton Flexitor rubber suspension unit to provide independent suspension of all wheels.

The Gipsy has an all-steel utility-type body providing 23½ cu. ft. of load space and seating for three abreast in front, with removable p.v.c.-coated leathercloth tilt and hoopsticks. Padded cushions are available to provide seats for six additional passengers in the rear body when required. With the petrol engine, the tare in kerb trim is about 26½ cwt., leaving a margin of 13½ cwt. for crew and payload within the maker's recommended maximum gross weight of 2 tons. With the diesel engine, the tare is increased and the loading margin therefore reduced by 1½ cwt.

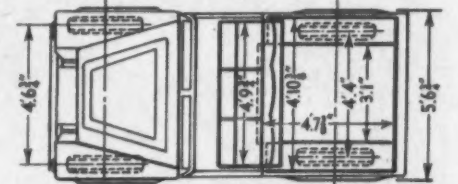
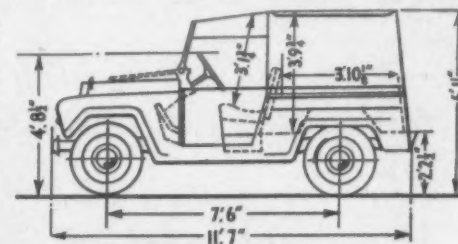
Well-Established Engines

The four-cylinder 2.2-litre overhead-valve petrol engine used in the Gipsy was originally fitted to the famous Austin Sixteen saloon and was later developed to power both the A70 and A90 cars, all of which established various speed and reliability records. When the A70 range was discontinued in 1952, the engine remained in production as the standard unit for Austin taxicabs and hire cars. The alternative diesel engine is the B.M.C. 2.2-litre four-cylinder indirect-injection unit, which was introduced for commercial vehicle and taxicab use in 1954. It embodies the Ricardo Comet III combustion chamber, which permits higher engine speed than is common in a diesel engine (in this case 3,500 r.p.m.) without sacrificing typical diesel fuel economy. Both engines are in current production and covered by worldwide spares and service facilities.

The Flexitor suspension unit and its characteristics in the Gipsy application were described in the article in our March 1 issue. Briefly, the unit comprises a hollow steel shaft bonded inside a rubber sleeve which is itself bonded inside a steel housing bolted to the chassis frame. A flange on the end of the inner shaft carries a trailing arm on the free end of which is mounted the wheel hub. Deflection of the wheel subjects the rubber sleeve to torsional shear. Inherent damping in the rubber springs is augmented by conventional dampers. Drive to all four wheels is transmitted from the fixed axle-gear housings through open tubular half shafts having Hardy Spicer needle-roller-bearing universal joints and steering swivel bosses are formed integrally with the front hubs.

* No. 444 in the MODERN TRANSPORT series of road tests.

We have recently driven a petrol-engined Gipsy some 600 miles under a wide variety of conditions, during which we developed a great respect for its capacity for hard work and its ability to provide a fast and exceptionally stable ride over the worst surfaces we could find. Even with the petrol engine, the fuel cost of great versatility, which ranges from acceleration and top speed not far short of that of the average family saloon to ability to climb an unsurfaced 1 in 2 gradient with a half-ton load, is not high. Our 600 miles of very mixed driving was covered for an overall average consumption of commercial-grade petrol of just under 20 m.p.g. With the diesel engine, acceleration and top speed are likely to be rather



Drawings showing principal dimensions of the Austin Gipsy

lower while fuel consumption would probably be better by about 40 per cent.

Our total run embraced a variety of load conditions from empty to overload and included fast main-road motoring (400 miles), snowbound country-lane and urban traffic pottering (100 miles), our standard test route (70 miles) and Downs bridle-path and quarry mud hopping (30 miles). Petrol consumption varied from around 15 m.p.g. in off-road running, with a 10-cwt. load and with occasional use of front-axle drive and auxiliary low gears, to about 23 m.p.g. in main-road driving at moderate speeds with a 5-cwt. load.

Unusually Stable and Controllable

The Gipsy would not be our first choice of vehicle for exclusive road use in this country, for there are conventional dual-purpose vehicles that will carry 10-12 cwt. loads or eight passengers more economically, more comfortably and more quietly. On the other hand, it offers exceptional

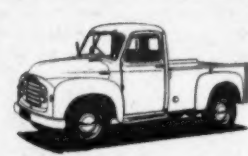
As tough as only COMMER • KARRIER can make them!



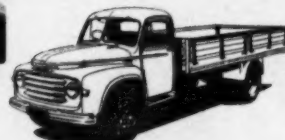
A competitive and fully proved range of petrol and diesel trucks, vans, dumpers and special purpose vehicles... for loads up to 12 tons



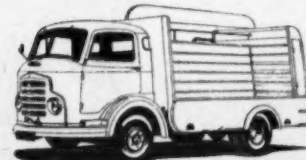
Commer 1½ ton forward control van



Commer 1 ton 'Superpoise' pick-up



Commer 'Superpoise' 3-4 tonner



Karrier 'Bantam' 2-3 tonner

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value for money in that it is free of British purchase tax, costing only £650 with petrol engine and £755 with the diesel, and it is undeniably superior in any situation that requires movement off a well-surfaced road. In agriculture and construction-site work and in undeveloped areas without roads, it will prove an invaluable tool. All-round independent suspension preserves maximum ground contact of each wheel without interference from deflections of the opposite wheel of an axle and the trailing-arm layout (as opposed to a swing-axle form) keeps the full width of the tyre tread in contact when a wheel is deflected. Consequently, the Gipsy can be kept moving under conditions that would bring most other wheeled vehicles to a halt and is unusually stable and controllable under difficult conditions.

On the road, we found that without a load, the

ward journey of 125 miles was covered at an average speed of 33 m.p.h., generally without exceeding 50 m.p.h., for a fuel consumption of approximately 22 m.p.g. On the return journey, made almost entirely in darkness, the vehicle was driven hard all the way, with speeds of 60-70 m.p.h. maintained for long stretches. Average speed was a point over 40 m.p.h. and petrol consumption slightly better than 18 m.p.g. At this point, having covered a total of 450 miles, 3 pt. of oil went into the rather inaccessible filler cap at the back end of the rocker cover to bring the level in the sump to the maximum.

This run accentuated the Gipsy's road-holding qualities on indifferent surfaces and it was found that, once accustomed to a tendency to oversteer, the vehicle could be taken through most corners with confidence and safety a good deal faster than

TEST RESULTS AT A GLANCE

Vehicle Details
MAKER: Austin Motor Co., Limited, Longbridge, Birmingham.
TYPE: Gipsy 4-ton 4 by 4 Utility vehicle.
ENGINE: Four-cylinder petrol, bore 3.125 in. (79.4 mm.), stroke 4.38 in. (111.7 mm.), capacity 134.1 cu. in. (2.199 litres), compression ratio 8 to 1; 65 b.h.p. at 4,000 r.p.m., 111 lb./ft. torque at 1,500 r.p.m. Coil-distributor ignition with centrifugal-vacuum automatic control.
TRANSMISSION: Clutch, 9 in. dia. Borg and Beck dryplate, hydraulic operation, lining area 70.3 sq. in. (453 sq. cm.); gearbox, four-speed synchromesh (except first), ratios 2.05, 2.35, 1.37 and 1 to 1 forward, 4.49 to 1 reverse; transfer box, two-speed, ratios 1 to 1 (rear drive only) and 2.02 to 1 (four-wheel drive only); driveshafts, open tubular balanced shafts with needle roller bearing universal; axles, hypoid bevel gear in housings mounted in chassis frame with needle roller bearing universals in half shafts, ratio 5.125 to 1.
BRAKES: Girding hydraulic two-leading-shoe, 10 in. (25 cm.) by 1 1/2 in. (44.5 mm.), total lining area 133 sq. in. (858 sq. cm.).
TYRES: 6.00-16 semi-cross-country pattern standard; sizes up to 8.90-15 to special order.
WHEELBASE: 7 ft. 6 in. (2.286 m.).
WEIGHT: Approximately, dry 1 ton 4 cwt. (1,219 kg.).
PRICE: £650 with petrol engine (no purchase tax); £755 with alternative 2.2-litre diesel engine.

Test Results
ROUTE: Mixed road and cross-country running totalling 580 miles.
CONDITIONS: Varying from cold with lying snow to mild and dry.
RUNNING WEIGHT: Varying from 1 ton 6 1/2 cwt. (1,270 kg.) to 2 tons (2,242 kg.) plus crew.
PAYLOAD: Over test route 2 1/2 cwt. (279.4 kg.) plus crew of two.
FUEL CONSUMPTION: Over 15 miles continuous road running with 5 1/2-cwt. payload 22 m.p.h. (8.32 km./litre) at 31.8 m.p.h. (50 k.p.h.) average speed.
GROSS TON/M.P.G.: 38.8 (14 tonnes/km./litre).
PAYLOAD TON/M.P.G.: 5.6 (2 tonnes/km./litre).
MAXIMUM GRADIENT CLIMBED: 1 in 2 (50 per cent) unmetalled.
TURNING CIRCLE: 41 ft. (12.5 m.) wheeltrack.
ADJUSTMENTS DURING TEST: None.
ACCELERATION: Mean times of several runs in each case, through gears:
0-30 m.p.h. 7.2 sec.
0-50 m.p.h. 18 sec.
In top gear:
10-30 m.p.h. 10.3 sec.
BRAKING: Average of several measured stops on dry tarmac from 30 m.p.h., 35 ft. (10.7 m.) equivalent to 29.4 ft. per sec. per sec. or 0.91 g. average retardation. Tapley meter 93-94 per cent. Handbrake only, Tapley meter 26-30 per cent.
ESTIMATED TOP SPEED: About 70 m.p.h. (112 k.p.h.).
OVERALL FUEL CONSUMPTION: For 580 miles, including 80 miles in London, 30 miles off the road and all usual acceleration, stop-start and braking tests, 20 m.p.g. (708 km. per 100 litres).

Gipsy suspension was on the firm side and the most comfortable ride was obtained with a load of 4 cwt. or more. Steering was also rather heavy at slower speeds, with little self-centring action, when we took the vehicle over with only 1,000 miles recorded on the odometer; to be just, this was either of so little account that we had become completely used to the steering after 200 miles or so or the additional mileage was sufficient to complete the easing-out process of initial joint stiffness. In any case, towards the end of our five-day acquaintance, the steering appeared to be much more responsive and a quite helpful caster action had developed.

Noise was also a factor that might weigh against the vehicle for normal road use, though this was not more obtrusive than could be expected with a transfer gearbox, two driven axles and a multiplicity of Hooke-type joints, capped by an uninsulated steel body. The engine performed quietly and noise from road shocks was suppressed by the rubber suspension; noise level from the other sources was low up to about

many modern saloons. Similarly, on rutted, potholed and loose-surfaced downland tracks, the Gipsy could be driven safely at speeds that would quickly have wrecked most vehicles and reduced their load to pulp. The vehicle also performed well on snow and other slippery surfaces, requiring four-wheel drive only on steep gradients or when traction was lost at one of the rear wheels. A locking differential at the rear would reduce the need for front-wheel drive, which also mandatorily engages low auxiliary ratio, even more.

Excellent Brakes

The test results published in the table were all obtained with a 5 1/2-cwt. load and crew of two in the vehicle over the standard MODERN TRANSPORT test route. As will be seen, the brakes were excellent, giving 0.9-g. average deceleration in emergency stops from 30 m.p.h. on good surfaces for fairly heavy pedal pressure. All foot controls were a shade on the heavy side, though stout pendant pedals well suited to hefty mud-hopper boots and embossed on the surface to provide



In such conditions as these (the Walter Smith (Quarries), Limited, Northill Quarry at Cheltenham and, right, Church Road, Woldingham) the Gipsy has pre-eminent stability and wheel adhesion

35 m.p.h., reached a crescendo between 40 and 45 m.p.h. and again diminished to a reasonable level at 50 m.p.h. and over. An application of sound-insulating paint on the underside of the body might prove a good investment on vehicles used fairly extensively on the road.

High-Speed Driving

In fact, the Gipsy proved an extremely pleasant and satisfying vehicle to drive at high speeds both on and off the road and, discounting a certain liveliness at the back end when running empty, its handling characteristics and performance were not sensibly changed by variations in load up to rather over the recommended maximum gross weight of 40 cwt. The petrol engine is tuned for torque where it is wanted, and in conjunction with the gear ratios provided, gave the competitive acceleration performance on commercial-grade petrol shown in the test results table and commendable direct-drive flexibility.

Indicative of its suitability for long journeys at useful average speeds and with reasonable economy, when the Gipsy was used as personal transport between Richmond, Surrey, and Dereham, Norfolk (a 5-cwt. load was carried), the out-

grip for rubbers. The gearchange lever and steering wheel we found conveniently positioned and the seat, belying its appearance, comfortable even at the end of a 250-mile drive. But the handbrake lever is not so conveniently situated near the floor under the driver's left leg, though reachable at a stretch for hill starts, and the driver of larger stature might yearn for a few inches of seat adjustment to give him more knee-room.

The tilt and hoopsticks are quickly demountable for conversion to an open truck and the wind-screen folds forward for securement on the bonnet top. Both doors and tailboard are also quickly removable for service in which they would be an embarrassment. Maintenance should be fairly straightforward once the chassis lubrication points are located, and this is simplified by complete elimination of the need for lubrication or attention to the suspension system. Although unshrouded, slip and universal joints in propeller and axle shafts are provided with lubrication points and should give long trouble-free life if properly serviced. All in all, the Gipsy is a sturdy, well-conceived vehicle for which it is easy to predict a long and successful life; it appears most aptly in an issue concerned with overseas transport.

Trial Monorail in Tokyo

(Continued from page 13)

the connecting bolts break or any other mishap occur.

The train is fitted with apparatus for making announcements to passengers, a telephone for emergency communication with the controller, lighting and ventilation equipment. The bulk of the apparatus required is mounted on the roofs of the cars. The telephone wires are fitted to the pillars alongside the track. Current for the traction motors is picked up by an unusual design of pantograph from double light tramway rails mounted upside down on the under surface of the running beam. The train is fitted with air brakes and there is an emergency braking device at the bogie centres.

Escape Chute

A special feature of the cars is the emergency chute fitted below the bodies. These chutes, of substantial metal construction, are hinged to the under surface of the cars at the driving ends. Should the train be immobilised on an open section of track, the controller can, if necessary,

lower the chutes to enable passengers to slide down to the ground.

The Hoh-en station in the main zoo is of one storey only, the cars coming down almost to ground level at this point. The structure is of lightweight steel, with extensive use of plastics on the exterior walls. This station is equipped with a hoist and can be used as a car depot. The other station, Bun-en, in the aquatic zoo, has two storeys and is of ferro-concrete construction. The track is some 16 ft. above ground level here and the platform is at first-floor level. The ground floor contains a booking-office, rest-room, toilets, etc., as well as a waiting-room.

The track installations were manufactured by the Yawata Iron and Steel Co., Limited, and construction was carried out on the site by Ishikawajima Heavy Industries, Limited. Electrical equipment for the train is by Tokyo Shibaura Electric Co., Limited, and the vehicles were built by Nihon Sharyo and Co., Limited. All contractors worked to the directions of the Tokyo Metropolitan Government.

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CLYDESDALE



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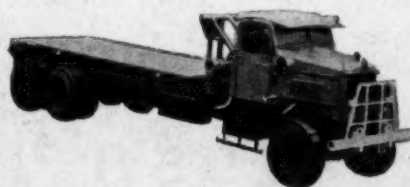
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PROPOSED UNDERGROUND RAILWAY FOR BOMBAY

To Relieve Traffic Congestion

IT is not unusual to find city transport problems deemed insoluble by those responsible for handling them. In the city of Bombay the authorities possibly have some justification for such a thought. The great city on the west coast of India is built on an island shaped like the claw of a lobster, some four miles wide at the thick end and about half a mile at the thin end and tapering off to a point surrounded by the Arabian Sea. On these few square miles are offices, flats and shops. Outer Bombay, on the island of Salsette and the mainland, has rapidly developed

to serve areas not covered by the public transport system, have contained proposals for underground railways. One scheme was to project the former Bombay, Baroda and Central India Railway from the suburban terminal at Churchgate, the business centre, to Colaba, a residential and military centre at the point of the island, looping back to museum, Ballard Pier (for mail steamers) and terminating at Victoria Terminus (former Great Indian Peninsular Railway). Another proposal dropped the tracks of the B.B. and C.I. Railway at Grant Road and into a cut and cover tunnel to Churchgate. At present the line runs alongside Queens Road and a number of passenger foot bridges and level crossings is provided. Difficulties to be overcome have always been that of the monsoon. Heavy rain may be experienced for several days on end, resulting in motor traffic being brought to a standstill with a foot or more of water in the streets. At certain conditions of rainfall and tide the permanent way at Grant Road Station is submerged with the water level up to the platform, a depth of about 4 ft. 6 in. It is difficult to see how this could be prevented from running down into a tunnel and flooding it.

Although London was the world's pioneer city in underground railway construction, and now has nearly a century's experience of it, with both the shallow and deep level technique, a team of Japanese experts was invited to examine the Bombay problem. The result of the investigations has emerged in a lengthy report, which seems to be very comprehensive and amounts to 102 pages and 150 drawings. It states that Bombay presents no geological problems so far as the construction of an underground railway is concerned.

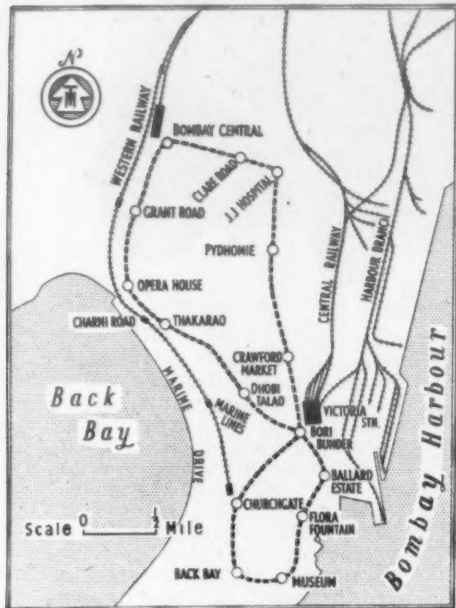
Stages

The total cost of the proposal is estimated to be about Rs.28.59 crores, or about £21½ million. The proposal is divided into two stages. Stage 1 would be a line from Museum to the Bombay Central (Western Railway, formerly B.B.C.I.R.) long-distance terminal, a distance of 4.38 miles. The stations on this route would be at Museum, Back Bay, Churchgate, Bori Bunder, Crawford Market, Pydhonie, J.J. Hospital, Clare Road and Bombay Central.

The second stage would also be from Museum to Bombay Central, a distance of 3.78 miles, with stations at Flora Fountain, Ballard Estate, Bori Bunder, Dhobi Talao, Thakarao, Opera House, Grant Road and Bombay Central. The time required for both stages is estimated to be four years each, but if work is done on both stages concurrently, six years in total.

It is estimated that the daily passenger density would be 400,000 at the end of the first year of operation rising to 575,000 at the end of the fifth year. Stage 1 line would probably carry 60 per cent of the traffic and stage 2 40 per cent. A flat rate of about 15 naya pice (about 3d.)

(Continued at foot of next column)



The proposed underground railway in Bombay

in the past two decades into a residential area from whence comes the morning rush to the city and back again in the evening.

Proposals

Great proportion of the commuter traffic is carried by the electric suburban services of the Central and Western Railways but parts not served by these lines are covered by the Bombay Municipality's services of buses and trams. Although tramways are now considered obsolete they still bear a heavy part in Bombay traffic, and a complicated network of track winds its way through the tortuous bazaar streets.

Recommendations to relieve the congestion, and

U.S. Diesel Railcar Developments

(Continued from page 17)

the more level country at the western end the railcar train showed its ability to maintain high sustained speeds over long distances, with maxima up to 90 m.p.h. One stretch of 121 miles was covered at an average pass-to-pass speed of 82.8 m.p.h.; this formed part of a run from Garrett to Rock Island Junction, 137.0 miles, in 96 min. 40 sec. start to stop, average 81.1 m.p.h.

80-m.p.h. Running

On the return trip some of the stops were more lengthy and the total time taken was 13 hr. 43 min.; the running speeds for the most part were slightly lower than they had been in the opposite direction, though the Rock Island Junction to Garrett run was completed at an average of 80.6 m.p.h. from start to stop, and the ensuing 128 miles from Garrett to Willard at 79.3 m.p.h. There were no equipment failures on the 1,542-mile round journey, nor any need for emergency overhaul. On the outward run the fuel consumption was 826 gal., which worked out at 2.8 miles per gal. per car; on the return journey it dropped to 710 gal., putting the mileage per gal. per car up to 3.3. The passenger reactions to the riding and comfort of the cars on these lengthy runs were entirely satisfactory.

As the result of this experience it was decided to substitute a train of RDC cars for the existing

Washingtonian locomotive-hauled train between Baltimore, Washington and Pittsburgh, and to combine this service with trains Nos. 35 and 36 between Baltimore and Philadelphia, as all four of these trains were losing money. An order was therefore placed with the Budd Company for two trains, each comprising one RDC-2 and two RDC-1 cars. In view of the length of journey involved, reclining seats were substituted for the normal walkover type, and the interior of each of the two RDC-2 cars was rearranged to provide a 24-seat dining section with stainless steel kitchen, 24 passenger seats, and a 14-ft. baggage compartment.

Restaurant Car Express

These trains, christened the Daylight Speedliners, went into service on October 28, 1956, on a timing of 8½ hr. for the 428.7 miles between Philadelphia and Pittsburgh, 15 intermediate stops included, whereas the previous Washingtonian had required 8 hr. 40 min. westbound and 8½ hr. eastbound for the 332.8 miles between Baltimore and Pittsburgh only. In the first year this comfortable and considerably accelerated service has increased passenger revenue by 13 per cent and has cut operating costs by 47 per cent; the increase in net revenue of 1.37 per train-mile has turned a loss into a profit. Each train has 204 passenger seats, excluding the 24 in the dining section.

The biggest user of RDC cars in the United States today is the New York, New Haven and Hartford Railroad, with over 100 cars of different types in use, operating practically the whole of this railway's passenger services other than the principal express trains between New York and Boston. Six of the cars, however, have been assembled into a single train for the New York-Boston service, in competition with a variety of other trains of the latest ultra-lightweight types.

Long Continuous Runs

The longest continuous workings of RDC cars are over the Western Pacific main line, where two cars, operating as single units, average 792 miles daily on the run of 924 miles over the whole length of the W.P. main line between Salt Lake City, Utah, and Oakland Pier, San Francisco, which takes about 23 hr. These Zephyrettes, as they are known, provide the only passenger service daily to and from all but the principal stations of this main line, and have had an extremely good reliability record on this exacting assignment. The Pennsylvania-Reading-Seashore Lines run six-car RDC trains out of Camden Terminal, Philadelphia, which split en route into three two-car sets, one for Ocean City, the second for Wildwood and the third for Cape May. Other railways use multiple-unit assemblies of RDC-1 cars for suburban service, in particular from Chicago. In all, between 300 and 400 diesel-hydraulic railcars of the various RDC types are now in operation on American and Canadian railways, and their number is being steadily increased as one successful attempt at least to stem the recession of American railroad passenger traffic.

(Continued from previous column)

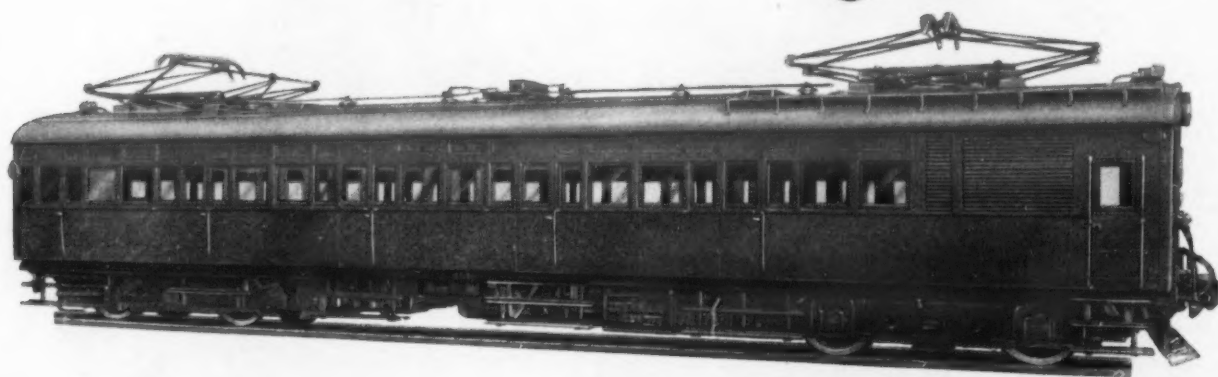
would be charged and there would be no intermediate stages.

The line would be open from 5 a.m. to midnight with a 10-min. service, with a 5-min. headway from 7.30 a.m. to 8.30 a.m. and 11 a.m. to 5 p.m. During the peak hours between 8.30 and 11 a.m. and between 5 and 8.30 p.m. a 2½-min. service would be given. It is expected to clear 840 passengers a train during the peak period in six-car trains, each car having a capacity of 140 passengers. The scheme also provides for the running of eight-car trains on a 2-min. headway.

Cut and Cover

The type of construction investigated is cut and cover, with reinforced box-type subway. The tunnel would have a height of 23 ft. 7½ in. and a width of 14 ft. 9½ in. The stations would have platforms 443 ft. long and they would be 10 to 11 ft. wide when side platforms were used and from 16 to 20 ft. wide at island platform stations. Signals proposed are of the three-aspect automatic type. The suggested gauge is 4 ft. 8½ in., whereas the principal gauges at present in use in India are 5 ft. 6 in. (broad gauge), 3 ft. 3½ in. (metre gauge) and 2 ft. 6 in. (narrow gauge). Power supply would be at 750 volts direct current. Passenger coaches with a length of 50 ft. 10 in. and a width of 9 ft. are projected and their capacity would be 140 (44 seated and 96 standing). The report also contains the estimated revenue, operating and maintenance figures for five years following the date of opening. It also mentions a possible extension of the line from J.J. Hospital to Sion.

EXPERIENCE COUNTS!

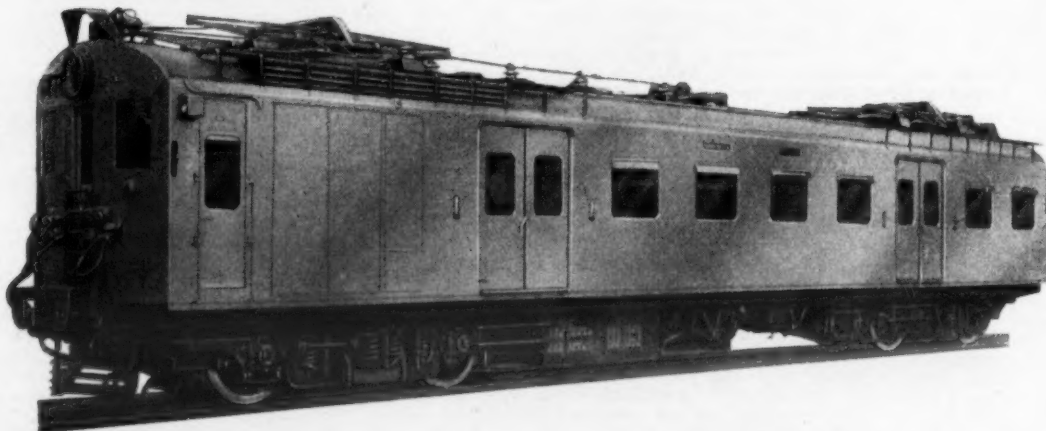


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NIGERIAN HARBOUR PROJECT

Wharf Extensions at Port Harcourt

PROGRESS is being made by Taylor Woodrow (Nigeria), Limited, on the £3½ million wharf extension scheme at Port Harcourt, the principal seaport of Eastern Nigeria. Work began last year and is due for completion by 1960. The Port Harcourt project, Taylor Woodrow's second large West African harbour contract (the first was the £5 million Takoradi extensions in neighbouring Ghana) was designed for the Ministry of Transport of the Federal Government of Nigeria, by the consulting engineers, Coode and Partners, of

offices and ancillary services such as fire, police and ambulance station, port health offices, preventive service, carbide and matches store, and housing for the port authority staff. The architectural design of the dock offices was carried out by the Architects' Co-Partnership of London and Lagos, in collaboration with the consultants.

Water Supply and Drainage

Completely new water supply and drainage systems are to be incorporated in the project. For



The existing wharf at Port Harcourt with work on the new extension progressing in the background

Victoria Street, London, and will provide berths for three more ships, virtually doubling the port's capacity.

New Wharfing

The wharf wall will be 1,500 ft. long, formed of steel sheet piling, 67½ ft. long, with a hollow reinforced concrete superstructure carried on 660 reinforced concrete piles 16 in. square. Each berth will have a transit shed 350 ft. long by 150 ft. wide and 25 ft. to the bottom ties of the roof trusses, steel framed, with columns encased in concrete and supported on reinforced concrete piles. The cladding will be of precast concrete block.

New marshalling sidings for the Nigerian Railway are being constructed over a six-acre swamp in the western area of the site. A fascine mattress will be laid over the swamp before filling takes place. Alongside the sidings will be a warehouse 400 ft. long by 150 ft. wide of similar construction to the transit sheds and with covered rail access to both sides.

Other buildings to be erected include dock

the water supply system a 200,000-gal. Braithwaite tank has been provided on a tower 40 ft. high, and is fed by two 6-in. Sumo submersible pumps in wells 165 ft. deep, involving approximately 2½ miles of pipe (up to 9 in. in diameter). The new drainage system will consist mainly of site-fabricated precast concrete pipes, discharging into the river below water level through the new wharf wall. Approximately 3 miles of drains up to 36 in. diameter will be used.

The contract includes moving some 550,000 cu. yd. of material, of which dredging at the new wharf to a depth of 26 ft. will account for about 350,000 yd. The remainder is being moved by draglines, face shovels and tipplers. The bulk of the excavated material is being used as fill on the site. A new rail outlet involves the laying of about 7 miles of new track, 40,000 cu. yd. of excavation and the construction of a new reinforced concrete bridge to carry the new access road across the railway line to the dock area. The contractor's staff is housed in air-conditioned bungalows in a temporary housing estate covering eight acres and including a staff club.

Large Indivisible Load

ON BENGUELA RAILWAY

THE largest individual load so far carried on the 3 ft. 6 in. gauge Benguela Railway comprised a piece of mining equipment of German manufacture shipped by the Belgian vessel s.s. *Capitaine Lauwereins*, which reached the port of Lobito last December. The equipment was imported by Union Minière du Haut-

Details of the load are as follow. The weight was 47 tons, the length 70 ft. 10 in., the width 9 ft. 10 in., and the height was 9 ft. 6½ in. The photograph shows the equipment loaded on a well wagon (of 50 tons carrying capacity) between two runners.

Movement on the Benguela Railway was re-



The large piece of mining equipment recently moved by the Benguela Railway

Katanga. That company's vast mining enterprises cover an extensive area of the Katanga Province of the Belgian Congo. Apart from copper, other minerals produced include cobalt, zinc and manganese. The Benguela Railway connects with the line of the B.C.K. Railway serving Katanga; that system is linked with the Rhodesia Railways.

stricted to daylight hours and transport from Lobito to the Congo frontier (838 miles) took six days. The maximum speed allowed was 22 m.p.h. on the straight and 9 m.p.h. on curves; the minimum radius of curvature is 100 metres. No special care was required on bridges and all curves were easily negotiated.

Institute of Transport in Dublin

PROGRAMME FOR JUNE CONGRESS

DUBLIN will be the venue of this year's congress of the Institute of Transport, to be held under the auspices of the Irish section of the Institute from June 3 to 6 inclusive. Papers will be presented by Mr. T. C. Courtney, chairman, Coras Iompair Eireann, on "The provision of diesel-electric locomotive power for C.I.E." and by Sir Brian Robertson, chairman, British Transport Commission, on "The organisation of trans-

port." Included among places to be visited are the Donnybrook bus garage and bus station, the Inchicore railway works of C.I.E., Collinstown Airport, the Guinness brewery, and the Port of Dublin; there will be an all-day excursion by radio train to Killarney. Social functions will include receptions by the Government of the Republic of Ireland and by Sir Reginald Wilson (president of the Institute) and Lady Wilson.

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DIESEL-ELECTRIC LOCOMOTIVES FOR MAIN LINE SERVICE

As part of their far-reaching modernisation plans, British Transport Commission called upon BTH to supply ten 800-h.p. diesel-electric locomotives for main-line freight duty. The illustration shows the first of these locomotives on test



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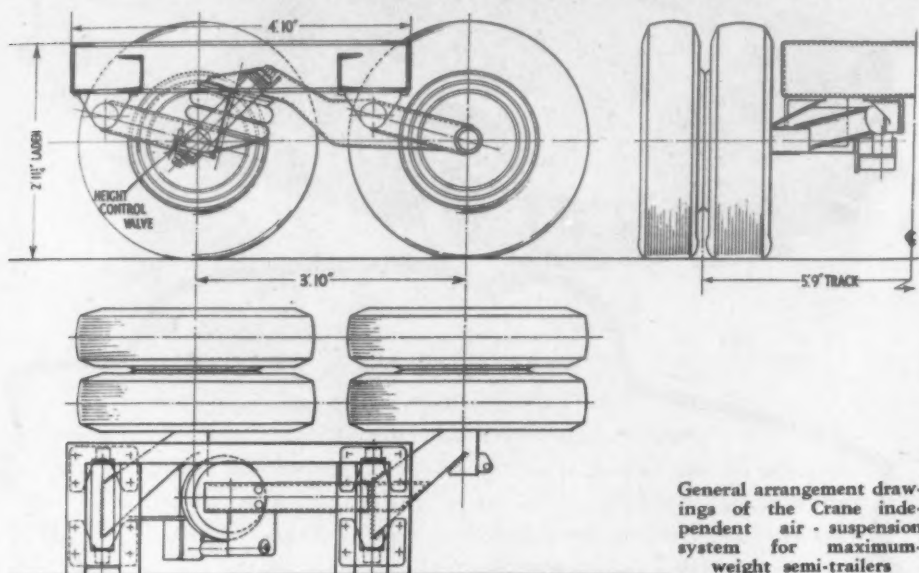
AIR-SUSPENSION TRAILER

Unique Design by Cranes (Dereham) Limited

AMIRABLY adhering to that early American motor engineering adumbration "Simplify and add more lightness," Cranes (Dereham), Limited, South Green Works, Dereham, Norfolk, has developed what appears to be a commendably clean and uncomplicated design of pneumatic suspension for a bogie articulated trailer for operation at the legal (United Kingdom) maximum weight of 24 tons. The prototype vehicle has successfully completed manufacturer's

dimensions for shipping without disturbing the actual suspension and for major maintenance.

As will be seen from the accompanying illustrations, each wheel hub is carried on a stub axle mounted at the outer end of an individual trailing or radius arm, which relieves the springs (of whatever type) of all but vertical loads. Hitherto, a single semi-elliptic laminated spring interacting between the two radius arms on each side has provided the flexible medium and this Crane design



General arrangement drawings of the Crane independent air-suspension system for maximum-weight semi-trailers

trials and when we saw it demonstrated recently, was about to be placed in experimental service by British Road Services.

Two Air Bags

Points of particular interest in the Crane design, for which patent application has been made by the company, are the adaptation—by not very extensive modification—of the already well-proved Crane tandem trailing-axle (radius arm) independent bogie suspension using laminated steel springs; the use of only two instead of the customary four air bags to support two axles; and a complete absence of the torque, radius and Panhard rods usually required with air suspension to take care of braking torque and the normal transverse and longitudinal forces. The Crane pneumatic suspension can be accommodated in a normal chassis frame or built into a sub-frame, making it suitable for use with frameless semi-trailer tanks, and is equally applicable to any two-wheeled trailer employing the independent trailing-arm principle. The sub-frame method of mounting also permits rapid removal to reduce

has gained a reputation for stability, easy riding and weight advantage. In the pneumatic suspension, the steel spring is replaced by a Firestone circular-section convoluted air bellows with 8-in. stroke, which is interposed between the upper side of the forward radius arm and the lower side of an extension forward of the fulcrum of the after radius arm.

To the basic advantages of independent suspension are thus added the acknowledged advantages of air springing, which can provide further saving of weight, constant platform height irrespective of load, automatic levelling to counteract the effects of uneven loading and steeply cambered roads and true progressive springing that provides as smooth a ride when running light as when laden. In the Crane design, all compensating link movement takes place across the flexible air bellows, thus eliminating the sliding friction of the slipper block necessary in the steel-spring arrangement. To take care of the various additional forces as well as the vertical loads imposed on the radius arms, the arms pivot on large-diameter Skefko double-row self-aligning roller bearings,

which have a similar ability to take care of mal-alignment to a self-aligning ball bearing but provide line contact under load instead of point contact and so have a much greater load capacity in a given overall diameter.

Integral Surge Tanks

Air pressure for the suspension is provided from the vehicle compressed-air braking system, which operates at a pressure of about 85 p.s.i. Such a high pressure is seldom required for the suspension system, except perhaps under high shock loading in the fully laden condition. Examination of the pressure gauges thoughtfully fitted by the manufacturer to each unit of the vehicle demonstrated to us showed that static pressure in the system at no load was 5 p.s.i. and about 55 p.s.i. when the trailer was carrying a 17-ton load. A safety device in the pressure system ensures that the brake air reservoir is fully charged before air is admitted to the suspension system.

An interesting and weight-saving feature of the design is the use of the extension lever of each rear radius arm, which is hollow and fabricated of welded steel plate, as a surge tank for its respective air bag. Each surge tank has a capacity of 400 cu. in. A Westinghouse levelling valve is fitted to each unit, the valve operating lever being mechanically connected across the air bag. Increasing distance (lighter loading) between the ends of the bellows operates the valve in one direction, releasing air from the bellows to atmosphere, and decreasing distance (increasing load) operates the valve in the opposite direction, admitting air from the surge tank to the bellows, until the predetermined level is regained.

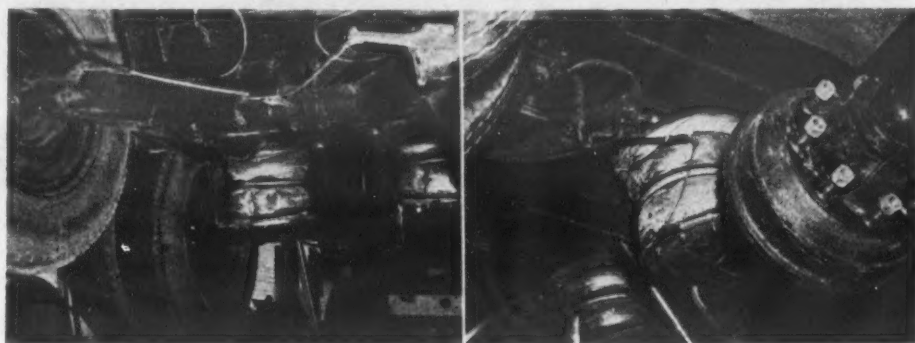
Unlike some air-suspension systems, no mechanical delay is employed in the valve operating mechanism but in fact a delaying action is introduced by the use of calibrated orifices in the

demonstrated was coupled to a Leyland Beaver tractor and put through its paces both laden and unladen on a rather broken and weed-grown dis-used airfield runway near Dereham. To provide comparison with a steel-sprung vehicle, a Crane tandem radius-arm trailer with semi-elliptic springs, similarly hauled, was run in company with the air-suspended unit. In the unladen condition, it was possible to ride on the platform over the bogie of the new trailer on this quite rough surface at varying speeds up to the maximum without discomfort. Comparison obtained in riding on the other trailer was odious in extremis, though the Crane steel-sprung radius-arm trailer provides an undeniably easier ride unladen than many contemporary designs.

17-ton Load

Swinging the new trailer about and emergency stops both in a straight line and in sharp turns demonstrated convincingly its superior wheel adhesion and stability and similar manoeuvres made after 17 tons of steel plate had been loaded on the trailer confirmed the earlier impressions. Certainly, the centre of gravity of the load was only a few inches above the platform and a higher c.g. might have underlined the anti-roll characteristics of the system more forcefully. Nevertheless, disposition of the weight to one side of the centre line of the platform did show the beneficial effect of automatic levelling. The platform remained sensibly level to the eye both while the vehicle was stationary and in motion and reference to the pressure gauges showed that static pressure in one unit was 45 p.s.i. and in the other 55 p.s.i., compensating for the unequal loading.

The B.R.S. unit has conventional two-line air-pressure braking, fifth-wheel coupling and hand-operated mechanical screw landing gear. It is fitted with a 24-ft. timber platform and headboard



Two views from below, one showing the nearside rear radius arm and both air bags and dampers and the other, right, showing the rocking levers-cum-surge tanks and one of the levelling valves

levelling valves. Damping is provided by a Woodhead-Monroe telescopic shock absorber mounted in parallel with each air bellows. Resilient support when there is no pressure in the system is provided by four rubber buffers fitted internally to each end plate of the bellows and these stops also permit completion of a journey though at reduced speed, in the event of accidental loss of pressure in the system while in service. The trailer for British Road Services recently

and with 9.00-20 twin tyres, the complete trailer has a tare weight of 2 tons 17 cwt. This compares with a weight of 3 tons 3 cwt. for the average conventional semi-trailer and, depending on the type of tractor used and equipment carried, provides a payload capacity of up to 17 tons inside the U.K. legal maximum gross of 24 tons. The new Crane suspension looks right and its performance in service with British Road Services will be watched with interest.

Firestone 'SUPER TRANSPORT'

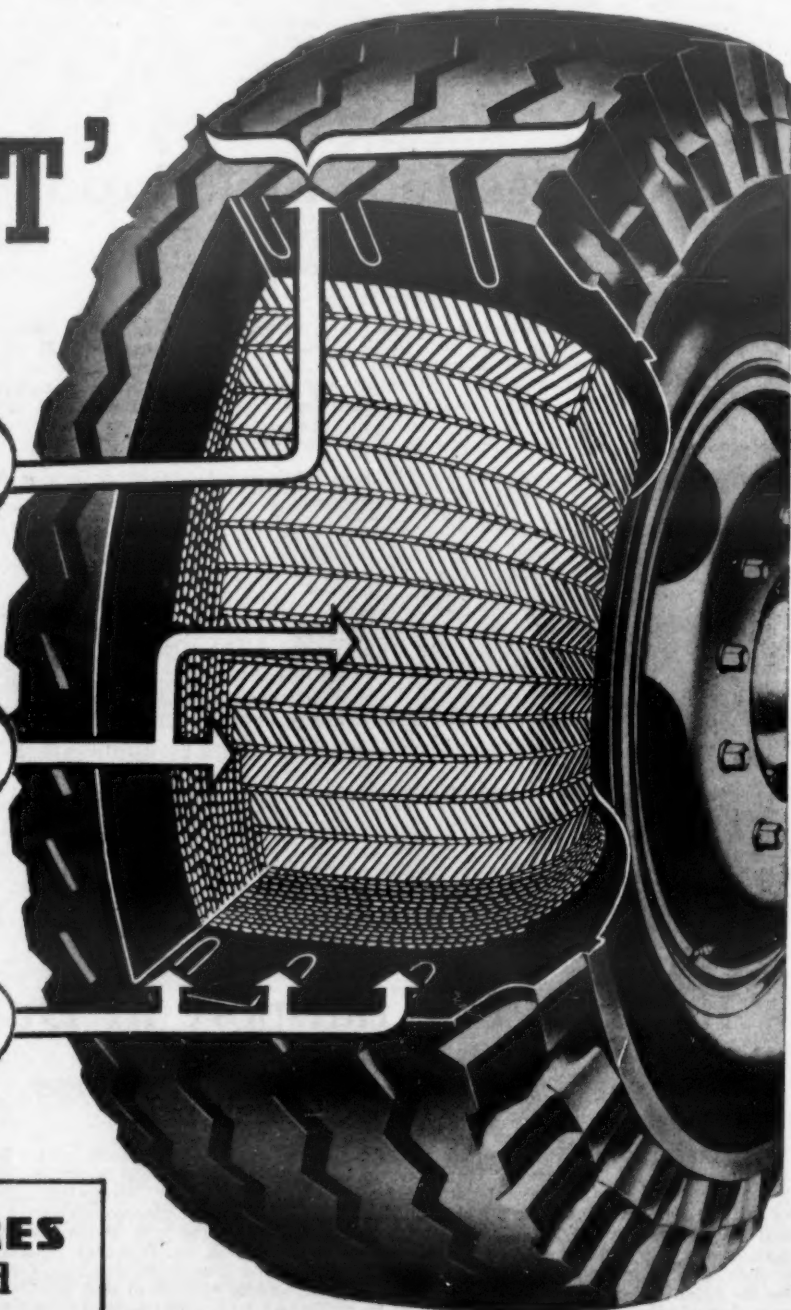
**A
premium
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Firestone total sales exceed £1,000,000 per day.



Firestone TYRES
—consistently good

FOR PROCESSED FOODS

Refrigerated Van on Bedford Chassis

A FLEET of three Bedford vans with Bonallack insulated and chemically refrigerated bodies has just been supplied to J. Spurling, Limited, wharfing and haulage contractor of Peel Grove, London, E.2, for general haulage of processed frozen foods. The chassis used is the Bedford 6-tonner with diesel engine on 8.25 by 20 tyres and with helper springs. The body is



Rear door of the insulated and chemically refrigerated box body built by Bonallack and Sons, Limited, on a Bedford six-ton forward-control vehicle

16 ft. 6 in. long inside, 6 ft. wide, and 6 ft. 6 in. high, giving a capacity of 624 cu. ft. The insulating material is a 5-in. thick layer of expanded polystyrene and a thermal efficiency of 65 per cent is achieved. The temperature of the traffic is zero to minus 5 deg. F. at the time of loading. About 6 lb. of Drikold an hour is required to maintain the low temperature. There are three bunkers, each of which holds a pair of 25-lb. blocks, to give refrigeration for 24 hr.

Body Construction

The body accords with the high standards of construction and finish set by Bonallack and Sons, Limited. It is framed in light alloy extruded sections, an inner and outer framework being

employed; the frames are tied together with spacers of 1-in. thick resin-bonded plywood. These form heat arresters to slow down heat flow. The external panelling is 20 i.s.w.g. light alloy sheet. The underfloor is of 18 i.s.w.g. light alloy sheet and the top floor of Dekaloy interlocking ribbed topped flooring. Then 16 i.s.w.g. light alloy sheet is used for the lining of the sides and front on the interior. The roof is lined with 20 i.s.w.g. light alloy sheet. Battens are fitted to the interior of sides to permit cold air to circulate around the load.

The speed with which quick frozen food processing has developed has left the manufacturer in a position which calls either for a continual heavy investment programme in the provision of his own specialised transport, or reliance on haulage contractors who are frequently not in a position to offer the type of vehicle essential to his needs. The essay in this field by J. Spurling has been guided by the principles laid down by the processors who have advised the firm. "Customer service is still our primary objective, and we have built these vehicles as an earnest of our intention to do all in our power to provide transport which is suitable to the needs of a rapidly expanding industry," it is stated.

Spurling Facilities

The organisation of this haulier was founded in 1885 and has progressed from its first motor vehicle, put into service before 1914, to a fleet which now includes some 85 modern vehicles. Allied to this road transport progress has been the development of wharves and shipping facilities which enable the group to offer a service both on movement of traffic throughout the U.K., and on imports or shipments abroad. The function of free enterprise contractors, it is felt, should be to study customers' special needs, and in face of normal commercial risks and hazards, to build vehicles to the specification they require. "In this way, we are fulfilling a function which we consider to be far more flexible than nationalised transport can offer, and we look forward to the continued goodwill and co-operation of our customers to assist our activities," says a message from the company upon introduction of the Bedford-Bonallack refrigerated vans.

TRAFFIC ENGINEERING AND SAFETY

September Meeting in Copenhagen

TWO important international meetings take place in Copenhagen this autumn, when traffic experts and road safety workers from all parts of the world will assemble from September 16-23 at the invitation of motoring and safety associations of Denmark, Finland, Norway and Sweden. At the Fourth International Study Week in Traffic Engineering, representatives from the greater part of Europe, including the U.S.S.R., and from several other countries (U.S.A., Japan, etc.), will meet under the chairmanship of Mr. Paul Le Vert, director of the transport division, United Nations Economic Commission for Europe. Among the subjects to be discussed are methods and results of traffic analysis; influence of new and improved roads on the distribution of traffic; special aspects of all-purpose roads and streets and of motorways; capacity of urban roads; time distribution of accidents; effects of the installation of parking garages; and introduction of parking meters or other methods of control. Some 50 reports will be presented for discussion. The study week will be followed by an International Road Safety Congress, also organised by the O.T.A. in collaboration with the International Federation of Senior Police Officers (IFSPO), and with the co-operation of the national road safety organisations of numerous countries. The human element as a factor in traffic accidents will be examined from different points of view, especially in regard to education of children, the use of statistical data, and the value of employing the shock technique as a means of education or propaganda. A review of the activities undertaken in various parts of the world to combat traffic accidents will also be made. The congress will be presided over by Madame R. Liger, president of the working party on the prevention of road traffic accidents, U.N. Economic Commission for Europe.

During the meetings, there will be an international exhibition of road safety propaganda posters and road safety films made in several countries will be shown. Full details concerning these meetings can be obtained from the World Touring and Automobile Organisation, 32 Chesham Place, London, S.W.1, England, the organisation responsible for the administrative arrangements for the meetings.

ANOTHER JONES 10-TON CRANE

Four-Wheeled Model

A SECOND 10-ton mobile crane has been introduced in the Jones range distributed by George Cohen, Sons and Co., Limited. This KL 10-6 model is mounted on a two- or four-wheeled steering chassis (available also as a rail bogie), whereas the KL 10-10 Fast Travel model, announced in May last year, is a six-wheeled road vehicle unit. The KL 10-6 is a diesel unit embodying the direct mechanical drive characteristic of the Jones range. In this, power from a Perkins 35-b.h.p. diesel engine is transmitted through a three-speed gearbox and triplex roller chain drive and thence by dry-plate clutches to the four crane motions, each mechanism being self-contained. Power steering is incorporated.

A feature of this new model is the lowering mechanism. Lowering is accurately controlled by a governor mechanism, which is offered as standard; alternatively, control is effected by an auxiliary drive from the engine. Jibs of lattice construction are available in lengths from 30 ft. to 70 ft. Swan-neck and other type jibs can be supplied. Maximum safe working load is 10 tons at 10-ft. radius with outriggers and 6 tons free on wheels at the same radius, using the 30-ft. jib. With the 70-ft. jib maximum lift is 3 tons at 17 ft. 7 in.

800-Mile Journey Under Own Power

A Jones KL 10-10 crane recently travelled under its own power the 800 miles from Letchworth to Leipzig for the International Fair. This could be the longest journey ever made by a mobile crane under its own power, but is well within the capabilities of this unit, with its 125-b.h.p. engine giving a top speed of 30 m.p.h., power-assisted steering and air brakes.

A new KL 44B crane, a modification of the existing KL 44, is a lower-priced version of that crane, taking cognisance of the fact that the exceptionally high operating speeds of the KL 44, while important on such duties as grabbing, are not required by every operator needing a 4-ton capacity machine. By modifying these operating speeds, it has been possible to introduce a low-powered air-cooled diesel engine while maintaining the same lifting capacity. The KL 44 remains in full-scale production.



Three large items of oil refinery equipment, a 127-ft. long solvent stripper, an 85-ft. extract tower and a 57-ft. waterwash tower, recently travelled from Venice over the Harwich train ferry. The train is here being assembled after disembarkation at Harwich

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Excessive strain tore off part of this tremendously strong large Draw Bench

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Thanks to the promptness of this repair a serious hold-up was averted, and the skill and strength put into this particular job are typical of the Barimar Service. The pictures tell their own story.

Not only would a Replacement have cost a great deal more than the Barimar welding repair, but the strength and accuracy of the job is implicit in the Barimar Money-Back Guarantee that went with it. This guarantee is the Hall-mark of Exceptionally Fine Welding which is applied by industrialists and engineers all over the world.



The Barimar guaranteed repair made the Draw Bench stronger than ever, cost much less than a replacement, and averted a serious hold-up.

SPECIAL NOTE. All damaged parts, after the fittings have been removed, should be sent CARRIAGE PAID to the nearest Barimar address. A note that the job is on its way, is always helpful. When it is impossible to transport the damaged machinery, Barimar experts operate ON THE SPOT.

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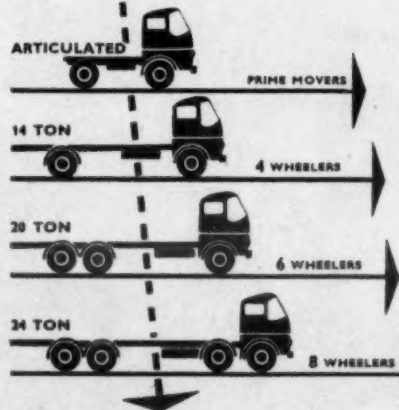
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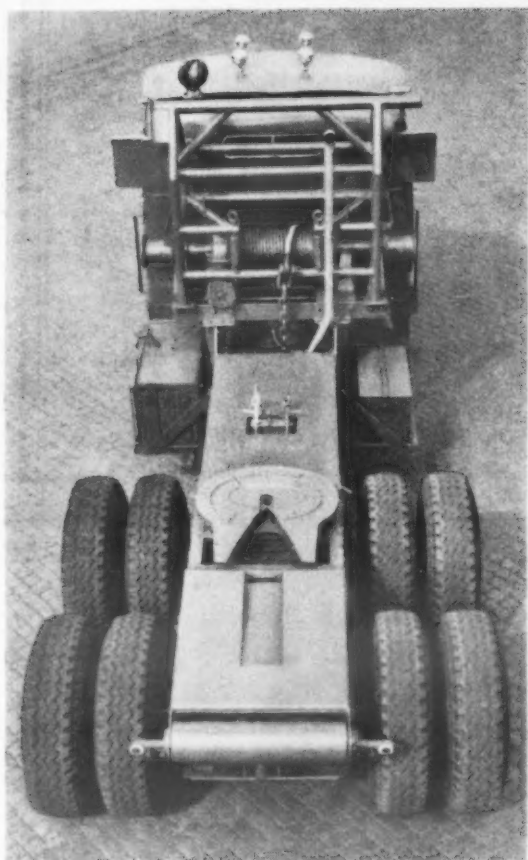
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LOCOMOTIVE ENGINEERS

Annual Luncheon

THE annual luncheon of the Institution of Locomotive Engineers was held in London on March 7 and was again a record gathering with 634 participants. Mr. E. S. Cox, the president, was in the chair. The toast "The Institution" was proposed by the Minister of Transport, Mr. Harold Watkinson, who said there were signs of the first fruits of railway modernisation. By the end of 1957 over 1,000 multiple-unit diesel vehicles were in service and were proving popular; L.M. Region traffic alone was up by 40 per cent over 1956 on those routes. As railways began to offer superior service they began to get the passengers back.

Modernisation of equipment required to be matched by modernisation of the mind. The recent manning agreement for diesel and electric trains between the Commission and the unions was therefore an enheartening step forward which reflected great credit on all concerned. In an industry which needed so much money before investments could pay off there were happy signs that the foundations were there to restore pride of service to railwaymen.

Freight Picture Disturbing

There was regrettably another side to the picture which was more disturbing. The present trend of freight tonnage, particularly in merchandise and livestock, was pointing too much downward for comfort. It called for an all-out drive both to improve the service and sell it. Solution of the problems of door-to-door service must be the aim of the railways and of their suppliers. The aim must be to cut to the minimum transshipment and sorting. Palletisation and special containers could help; if the loading gauge permitted, ideas like the piggyback and the two-tier car transporter could assist the railways to be very competitive. If they could find a new way to capitalise its fast point-to-point times the railway could knock road transport into a cocked hat. He hoped the new charges scheme would help; the decentralisation of commercial contacts deserved the highest praise. He did not underestimate road transport, nor should his audience. The answer was not the arbitrary restriction of the C-licence operator but to use the capacity of the railways for further

reliable service; the railway capacity for long-haul service was greater than that of the roads, no matter how many new trunk roads be built.

In his reply Mr. E. S. Cox said they did not believe in the aims of the Railway Conversion League and he was glad to see the Minister did not believe in them either. They had had the noise of the steam locomotive with them all their lives; now there were 2,300 diesel engines heard in the land and the drone of 7,000 motors. "Thoughts of hanging marvelously stimulate a man's mind" and the steam men were now climbing on the bandwagon of the new forms of motive power and bringing a fresh outlook to them. Essential though specialisation might be, engineering judgment was vital today. The carriage and wagon man was also stimulated by the times and even the humble wagon was subject to new types, new shapes and exotic forms of brake gear. Their only failure was to find a place for copper-capped chimneys, despite Mr. R. F. Hanks's impassioned appeal last year.

Progress and a Presentation

After dealing with the excellent progress of the Institution Mr. Cox strongly emphasised that the mechanics of railway transport gave it a resistance lower than any other terrestrial means and greater safety, with ability to move high density traffic at high speeds. It was an agency essential to national wellbeing. They were a body of men dedicated to their purpose and could accomplish anything so long as they were told what they were supposed to do. Their enterprise could give a very new look to railway transport. He concluded with thanks to the secretariat. Mr. Cox presented Mr. John Vidal, his predecessor, with the bronze medal of the Institution, an award special in their annals, for his outstanding services to that body.

After Mr. Vidal's thanks Mr. S. B. Warder proposed "The Guests" of whom there were no fewer than 250 present and bade them welcome. Sir Reginald Wilson, member of the B.T.C., responded and said they were moving into the limitless possibilities of the future. He hoped the builders would export their products to every part of the world and become so rich they could reduce their prices to the B.T.C.!

Gauge Standardisation in Australia

(Continued from page 9)

The Royal Commission estimated the cost of this scheme at £21,600,000. The Royal Commission's estimate for the conversion of all lines, including the Queensland and Western Australian 3 ft. 6 in. gauge systems, was £57,200,000. The only portion of the Royal Commission's recommendation which has been carried out is the construction of a 4 ft. 8½ in. gauge railway linking Sydney and South Brisbane, via Kyogle and Richmond Gap.

The report was considered at a conference of State Premiers with the Prime Minister in Melbourne in November, 1921, when it was resolved:

"That the adoption of a uniform gauge is, in the opinion of this conference, essential to the development and safety of the Commonwealth."

"That the Commission's recommendation of a 4 ft. 8½ in. gauge is accepted."

"The Commonwealth shall prepare and circulate to the States a draft agreement to give effect to the recommendation of the Commission."

"That steps shall be at once taken by the Premiers of all the States to consult their Governments with regard to the said agreement, and the financial obligations of the parties thereunder, and that the conclusions arrived at shall be communicated to and considered at a further Conference in January, 1922."

The conference was held in Melbourne in January, 1922, but no decision was arrived at.

Sir Harold Clapp's Report

This matter was further investigated in 1945, and a report was submitted by the late Sir Harold W. Clapp on March 24, 1945, to the Minister for Transport and External Territories. Sir Harold recommended in that report that standardisation of gauges to 4 ft. 8½ in. be effected between Fremantle—Perth and Brisbane on the following basis:

- (1) An independent standard gauge line from Fremantle—Perth to Kalgoorlie;
- (2) Conversion to standard gauge of the entire South Australian 5 ft. in. gauge system and the 3 ft. 6 in. gauge lines of the South-East Division;
- (3) Conversion to standard gauge of the entire Victorian 5 ft. 3 in. gauge system;
- (4) (a) Acquisition by the Commonwealth through the State of New South Wales of the Silverton Tramway Company's 3 ft. 6 in. gauge line Broken Hill—Cockburn;
- (b) Conversion to standard gauge of the Silverton Tramway Company's line referred to in (a) and of the 3 ft. 6 in. gauge lines of the Peterborough Division of the South Australian Railways.

This involved 7,597 miles of track, at an estimated cost of £44,318,000.

The only work undertaken as a result of Sir Harold Clapp's report has been the conversion of practically the whole of the South Australian South-East Division to an interim 5 ft. 3 in. gauge, readily convertible to standard.

Examples Elsewhere

The difficulties and losses arising out of a multiplicity of gauges were experienced in other countries, notably in the United States and Great Britain, but early action was taken in those countries to solve the problem. Standardisation was accomplished in Great Britain between 1870 and 1872, except for some 435 miles of 7-ft. gauge and mixed gauge track owned by one company, but by 1892 this had all been converted to standard gauge. There were 23 different gauges in the United States in 1871, but a conference of the presidents of the various railroad companies in 1885 decided to convert all railways (about 14,500 track miles) to standard gauge within a year.

There has been a gratifying renewal of interest, in the last year or so, in the necessity for some urgent action to be taken to relieve the existing chaotic condition, at least so far as the main trunk lines are concerned. The disabilities affecting the Australian railway systems due to breaks of gauge were brought prominently to notice by the publication in October, 1956, of a Report of the Rail Standardisation Committee, which was set up in March, 1956, and consisted of Federal Members from the Government side of Parliament. This Committee was appointed to consider the practic-

ability and desirability of unifying the railway trunk lines on the Australian mainland.

After investigation, the Committee recommended:

- (a) The provision of standard gauge railway between Wodonga and Melbourne, which the Committee considers could be best achieved by constructing a new 4 ft. 8½ in. gauge track parallel to the existing line between Wodonga and Mangalore and converting one of the two existing tracks, Mangalore to Melbourne. (Estimated cost—£10,000,000.)
- (b) Provision of a standard gauge from Broken Hill to Adelaide via Port Pirie. (Estimated cost—£13,500,000.)
- (c) Provision of a standard gauge from Kalgoorlie to Perth and Fremantle. (Estimated cost—£18,000,000.)

Proposals for conversion in South Australia as referred to above are already provided for under an Act of 1949.

ROLLING STOCK

(Continued from page 10)

deliveries should be feasible in weeks rather than months. After all, this compares with five to six years for aircraft and four to five years for military motor transport.

In wagons one looks for economies in weight, materials and maintenance together with higher speeds both to provide for better services and to assist the maximum use of capital equipment. With higher speed greater safety is required, which costs money. This may be illustrated by the vacuum brake equipment, which together with new draw-gear and hydraulic buffers, is now being extensively applied to wagons on British Railways. The equipping of three-quarter million wagons with brakes is a tremendous programme. It has substantially increased the cost of the wagon, but it will enable wagon trains to run at much higher speeds, and so free the tracks for speedier schedules for both goods and passenger trains.

As regards materials, the main difference between wagons now and before the war is, first, that timber has been almost entirely abandoned except for the lining boards of covered wagons for perishable goods, and secondly, that riveted steel structures are rapidly being replaced by welded steel structures. The knowledge, equipment and techniques of welding steel received a great impetus during the war. The result is a lighter job, as structures can be designed without the lap joints, cover plates and the brackets which were necessary for riveting, and of course you save the weight of the rivet heads. To some extent also this cheapens the job. The result of welding is a smoother finish which in the long run attracts less dirt and corrosion.

Corrosion

Corrosion is still the bugbear. After a number of years the steel wagon is a depressing sight where it is subjected not only to its common lot of harsh treatment but also to the humidity and acids in the atmosphere of this island. Here, however, steels less liable to corrosion, which have been tried out successfully over a number of years, are now more and more being substituted, and in the last two years British Railways has instituted routine five-year scrape and repaint programmes. There seems to be no other effective and economic treatment to counteract this eyesore.

A number of experiments here and there has been carried out with wagons, some sheeted and some wholly built of aluminium alloy. British Railways built 100 16-ton mineral wagons at Shildon with aluminium alloy plates on floors and sides. Experience is that aluminium alloy stands up very well and much better than steel as regards corrosion, but in particularly hard wear it tends to puncture.

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ACCEPTANCE.—Advertisements can be accepted up to 2.30 p.m. on Monday to ensure insertion in the current week's issue. MODERN TRANSPORT is on Sale every Friday.

SITUATIONS VACANT

LONDON TRANSPORT require Senior Assistant to be responsible to the Signal Engineer for technical design work on telephone system and train describers used on London Transport. Applicants should have knowledge of automatic telephony and some knowledge of carrier wave working. Technical qualifications not less than Higher National Certificate (Electrical Engineering); salary range £1,210 to £1,420. Medical examination; free travel. Applications within seven days to Staff and Welfare Officer (F/EV 674), London Transport, 55 Broadway, S.W.1.

WORK Study Engineer required by Eastern Coach Works, Limited. The work involves complete investigations, methods improvement, and the application of work measurement to cost control and incentive bonus in light engineering; membership of contributory Pension Fund compulsory if successful applicant is under 40 years of age. Applications giving full particulars of age, education, qualifications and experience, present position and salary required should be submitted not later than March 31, 1958, marked "Private and Confidential" to Chairman of Eastern Coach Works, Limited, 10 Fleet Street, London, E.C.4.

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R.H.A. METROPOLITAN AREA
Annual Dinner

ON Monday of this week the annual dinner of the Metropolitan and South Eastern Area of the Road Haulage Association was held in London and was presided over by Mr. J. T. Turner, chairman of the area committee, who was supported by Mr. R. G. Crowther, national chairman, and a very large company. The principal guest was the Minister of Transport, Mr. Harold Watkinson; the Lord Mayor of London and the Sheriffs were also present. Mr. Turner felicitously welcomed the guests and mentioned that Mr. R. Morton Mitchell, chief executive officer of the R.H.A., had gone to a conference in France.

In his reply Mr. Watkinson said that he was glad the Association was taking into account the prospects of international free trade; if we did not pull it off both the Commonwealth and Europe would suffer. He had concluded an agreement with Belgium for the interchange of vehicles and he hoped to do so with other countries. It would be discussed at the conference of Ministers of Transport in October next. The Socialists were proposing to re-nationalise long-distance road haulage, and for all he knew, long-distance C-licensed operators too. The Government believed in its middle-road solution to give more efficient transport at lower cost and he hoped it would be regarded as a permanent solution. There was everything to gain if the industry was left alone and almost everything to lose if it was again plunged into a turmoil of party politics. His plea was not only for the sake of the industry, but for the sake of the country. Any change must have a damaging effect on our commercial position, vis-à-vis other countries.

The Lord Mayor, Sir Denis Truscott, also replied and said that in his capacity as a vice-chairman of the Automobile Association he viewed the starting of motorway projects as an opportunity of making up our backlog against Europe and the U.S.A. He hoped the problem of dealing with vehicles which came to an involuntary stop would be properly dealt with. The proceedings were followed by an excellent cabaret.

INTERURBAN COACH
SYSTEM

(Continued from page 11)

million dollar Steve Allen show. She is insured by Lloyds of London for \$300,000.

Faith

The depression caught the growing Greyhound concern midstride in its cross-country race. But the founders, who had made Chicago their national headquarters, had tremendous faith in Chicago's Century of Progress Exposition at a time when such optimism was not widespread. They contracted to operate 60 special buses on the fair grounds. They leased blocks of rooms in Chicago's hotels and organised tours from every state in the Union. These tours formed the basis for the wide variety of escorted tours and pre-planned tours for individual travel Greyhound now offers to every section of the United States, Canada and Mexico.

The vision of its founders of one linked-up network of bus systems has become a reality. In the 30 years from 1927 to 1957, Greyhound's gross operating revenues rose from \$2,536,000 to more than \$250 million. Today there are more than 71,000 stockholders as against the 269 of 30 years ago. Still headed by many of its early associates, but under the new leadership of Mr. Genet, the company today is constantly at work improving its system. It is still expanding services, equipment and station facilities to provide even more communities with better bus transportation. The latest development, announced in 1956, was the establishment of Greyhound Rent-A-Car, Incorporated. This subsidiary company leases fleets of cars and trucks on a long-term basis to industrial concerns, as well as to individuals on an hourly, daily, weekly or monthly basis. This is only one more facility added to the many already afforded by the corporation, which include the nationwide package express service and the U.S. mail carried on a contractual basis.

De Luxe

The introduction of the dual-level Scenicruiser in 1954 was heralded as an entirely new concept in bus travel. Today, with the addition of other equally de-luxe buses—notably the single-deck "Highway Traveller"—the name "Scenicruiser" has come to apply not so much to a new type of vehicle, as to a new standard of service to the public. It should, therefore, occasion no surprise that when Mr. Genet takes one of his first-hand looks at the various divisions of the gigantic corporation of which he is president, he travels in his own "presidential special" Scenicruiser. This has been converted into a mobile office, complete with desks, files, typewriters, tape-recorders, two radio-telephones, a lounge, kitchen and lavatory.

Mr. Genet is on record as having told a conference of American transport men that within the next decade American railroads will have "virtually abandoned the business of carrying passengers." He added that, within the same period, the number of communities entirely dependent on buses for public transportation will increase from 50,000 to more than 100,000. As a former traffic vice-president of the Chesapeake and Ohio Railway, Mr. Genet may know. Already the road vehicle beats the long-distance train on times between city centres, even between New York and Chicago against the famous *Twentieth Century Limited* express. As for the buses which future Greyhound passengers will be using, Mr. Genet predicts new and exciting developments—lighter weights, more glass, more colour and, above all, more safety, even though bus transport today, according to the National Safety Council, is America's safest medium. It will be interesting to learn what the organisation has up its sleeve.

The National Benzole Co., Limited, has amalgamated its Leeds and Sheffield divisions into a new West Riding division. Its offices are in Sheffield and the divisional manager is Mr. D. A. Dunbar.

The United Dominions Trust, Limited, announces that from March 10 its branch office in Oxford has been at Clarendon House, Cornmarket Street. The telephone number remains Oxford 48061.

OFFICIAL NOTICES

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APPOINTMENT OF GENERAL MANAGER

A GENERAL MANAGER will be required at the end of June next by this Company which operates approximately 480 public service vehicles from headquarters in Bournemouth.

Applicants should have had extensive experience in passenger road transport operations.

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SOCIAL AND PERSONAL

Railway Traffic Appointments

CONSEQUENT upon the amalgamation of the commercial and operating and motive power departments of the British Railways Central Staff into a single department under a chief traffic officer (Mr. Frank Grundy), the following appointments have now been made:

Mr. A. A. Harrison to be chief freight officer, traffic department (Mr. Harrison has hitherto been chief charges officer, commercial department, British Railways Central Staff, which appointment is now merged with that of chief freight officer).

Mr. E. A. W. Dickson, formerly chief passenger officer, commercial department, British Railways Central Staff, to be chief passenger officer, traffic department.

Mr. H. F. Pallant, formerly freight officer, commercial department, British Railways Central Staff, to be chief operating officer (traffic department) covering operating and motive power.

Mr. Eric H. Baker, M.I.Mech.E., M.I.Loco.E., M.Inst.T., who has been appointed motive power officer, London Midland Region, B.R., commenced his railway career in 1921 as a premium apprentice in the G.N.R. locomotive works at Doncaster and during this period attended Sheffield University. After serving at a number of motive power depots he was in 1935 made a technical



Mr. E. H. Baker

assistant to the locomotive running superintendent, Southern Area. There followed appointments as assistant district locomotive superintendent, West Riding (1937); and Cambridge (1942); assistant to the locomotive running superintendent, Eastern Section, Liverpool Street (1944); district locomotive superintendent, Peterborough (1945); and at Gorton (1946). In 1948 he was appointed assistant divisional motive power superintendent, Derby, L.M.R., and in 1954 divisional motive power superintendent, Crewe, the position he has now vacated.

Mr. J. C. H. Brash has been appointed district operating superintendent, Glasgow (North), Scottish Region, B.R.

Mr. A. E. Grimsdale, B.Sc.(Eng.), formerly manager, home sales, has been appointed director and commercial manager of Metropolitan-Vickers Electrical Co., Limited.

We regret to record the death at the age of 73 of Mr. J. S. Ramsden, M.I.E.E., who, until his retirement in 1950, was for 15 years a senior commercial director of the British Thomson-Houston Co., Limited.

Mr. Frank Bryan, traffic manager, Eastern National Omnibus Co., Limited, since 1932, retires on May 31. He joined Maidstone and District Motor Services, Limited, in 1920 and was subsequently with the National Omnibus and Transport Co., Limited, as district manager in its eastern and midland areas.

The London Midland Region of British Railways announces the following appointments:

Mr. J. Cowing to be chief assistant to commercial officer (freight), Euston.

Mr. F. G. Clements to be assistant (diesel), motive power officer's office, Euston.

Mr. K. F. Mason to be district goods manager, Warrington. Captain R. A. H. Lord to be district marine manager, Holyhead.

We regret to record the death, at the age of 73, of Mr. Harold Rudgard, O.B.E., T.D., M.I.Mech.E., M.I.Loco.E., M.Inst.T., chief officer (motive power) to the Railway Executive when he retired in December, 1950. Mr. Rudgard joined the Midland Railway in 1901 as a pupil of the locomotive superintendent. He was appointed to the above-mentioned post in October, 1947, when the Railway Executive was being set up. A portrait and biography appears on page 15.

Mr. G. H. Napthine, director and general manager of Hants and Dorset Motor Services, Limited, will retire on June 30. He started his career in the passenger road transport industry in 1920 as statistical officer with the East Surrey Traction Co., Limited, at Reigate, and later became assistant traffic superintendent. Following appointments in a subsidiary company of United Automobile Services, Limited, and in the Eastern National Omnibus Co., Limited, he became general manager of Westcliff-on-Sea Motor Services, Limited, in 1935, and subsequently was also appointed a director of that company. He became a director and general manager of Hants and Dorset in 1949.

At the annual dinner of the Western section of the Institute of Transport which took place at the Royal Hotel, Bristol, on March 4, the president, Sir Reginald Wilson, responded to the toast "The Institute of Transport" proposed by Mr. S. V. P. Cornwell (president, Bristol Incorporated Chamber of Commerce and Shipping). The Lord Mayor of Bristol, Alderman P. W. Raymond, J.P., responded to the toast "The City, County and Port of Bristol" proposed by Mr. R. H. Nethercott, regional secretary, Transport and General Workers' Union. The toast "Our Guests" was proposed by Mr. B. R. Jones (immediate past chairman of the section), and the response was given by the Sheriff of Bristol, Mr. W. E. Wheatley, J.P. The chairman of the section, Mr. J. C. Dean, O.B.E., presided.

Historical Railway Relics

FIVE organisations concerned with railway historical affairs, the Stephenson Locomotive Society, Historical Model Railway Society, Newcomen Society, Railway Correspondence and Travel Society and the Railway Club, were represented in a delegation received last week by Sir Brian Robertson, chairman of the B.T.C., to express their concern as to the preservation of railway historical relics and their desire to see the early establishment of a railway museum or museums. Sir Brian expressed his enthusiastic support of the objectives outlined by the delegation, and has gladly accepted the co-operation of a consultative panel to be set up by the organisations concerned. He also assured the delegation that everything would be done to preserve the relics at present in the care of the Commission.

Mr. W. H. Jenkins, O.B.E., M.Inst.T., hitherto transportation manager and deputy chief traffic manager of the New South Wales Government Railways, has been appointed chief traffic manager of that system, with effect from February 1, following the retirement of Mr. D. J. Howse, recorded in our January 25 issue. Mr. Jenkins joined the New South Wales Railways in 1912, and later served with the Australian Imperial Forces in Egypt, France and Belgium in the



Mr. W. H. Jenkins

1914-18 war. He has had extensive experience in clerical, operating and administrative duties in the railway service, was attached to the personal staff of the Northern Area Commissioner during the period 1925-32, and subsequently filled the positions of train controller, special officer, outdoor traffic superintendent, prior to appointment as traffic works superintendent in 1948, passenger trains superintendent in 1951 and transportation manager in 1952. He acted as chief traffic manager for the greater part of 1955 during the absence overseas of Mr. D. J. Howse. Mr. Jenkins is a vice-chairman of the N.S.W. section of the Institute of Transport, and was awarded the O.B.E. in the 1958 New Year Honours List.

Mr. R. G. Wilson, at present divisional manager of the North Eastern division of S.P.D., Limited, becomes general traffic manager at head office from April 1. He is succeeded by Mr. E. J. Frogley, at present planning manager, head office.

New Zealand Government Railways announces that Messrs. L. M. Johnston, E. M. Read and W. F. Hudson have recently been appointed to the position of district mechanical engineer in charge of, respectively, the Wellington, Christchurch and Dunedin districts.

The Rhodesia Railways Board has announced the appointment of Mr. J. H. Allen as deputy general manager. This post was made vacant when Mr. J. W. S. Pegrum assumed office as general manager. Mr. Allen became deputy chief superintendent of transportation (commercial) in 1951, and chief commercial manager in 1954. Two years later he returned to the general manager's office to fill the newly created post of principal executive officer (movement).

Mr. N. McDonald, M.Inst.T., who has been selected for the position of general manager of Warrington Corporation Transport Department, began his career in road passenger transport with Stockton Corporation Transport in 1933. In 1947, after five years' service with the R.A.F., being mentioned in dispatches, he was appointed senior traffic clerk, Hull Corporation Transport, becoming assistant traffic officer in the same year. He was made deputy general manager and traffic superintendent at Burton upon Trent in 1951 and was selected as traffic superintendent at Reading in 1952. Since 1955 he has been deputy general manager, Bolton Transport Department. While at Hull Mr. McDonald served as honorary secretary of the Humber-side section of the Institute of Transport and served in the same capacity to the Berks, Bucks and Oxon section at Reading.



Mr. N. McDonald

Sir David Eccles, President of the Board of Trade, formally opened Decca House on the Albert Embankment, London, on March 10. It is the new headquarters of the Decca companies.

Mr. H. H. Starr, M.Inst.T., assistant commercial manager, Western Region, B.R., recently retired having completed 50 years' service with the Great Western Railway and British Railways. He entered G.W.R. service in 1908 at Gloucester Goods Station. Mr. Starr, in 1945, was appointed road transport controller, London district goods manager, Western Region, in 1948, and in the following year general assistant to the commercial superintendent (terminals and cartage). In 1954, Mr. Starr was appointed assistant commercial superintendent, later assistant commercial manager, a position he held until his retirement.



For traction equipment, too— you need green fingers

Given the same soil, the same fertilisers, the same sunshine and rain; using, apparently, identical methods; two gardeners do not get the same results. One gardener grows perfect blooms in profusion but, try as he will, he can never tell you exactly how he does it. We say he has green fingers. But what really seems to have happened is that much he has learned over the years has become so completely part of himself that he does the right thing instinctively. Something of the



same kind happens in engineering—with an entire works playing the gardener. It is not a question of craftsmanship in the old sense, but of corporate and often sub-conscious knowledge. In a works that has been concerned with equipment for electric traction for years, the right decision seems 'natural', being based on knowledge that is so much a part of past experience that it is taken for granted. This is one reason why a name with a long history can still mean so much.

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IMPORTANT CONTRACTS

Alitalia Orders DC8s

THE purchase of four long-range DC8 jet airliners by Alitalia (Linee Aeree Italiane) has been announced by the Douglas Aircraft Company, at a cost, with spare parts, of approximately \$27,000,000. Delivery has been promised in time to provide service on the airline's intercontinental routes during the summer of 1960.

Leyland Diesels for Canada Lorries

A consignment of 100 direct-injection six-cylinder diesel engines are being shipped to Canada by Leyland Motors, Limited, for use as power units in the Canada lorries produced by Canadian Car Co., Limited, Montreal. The engines are rated at 175 b.h.p. at 2,200 r.p.m. with a torque of 495 lb./ft. at 1,100 r.p.m.

Atkinson Lorries for S.A.R.

Announced recently in Johannesburg by Mr. W. G. Allen, chairman of Atkinson Lorries (Holdings), Limited, was a contract worth more than £250,000 for Atkinson vehicles placed by South African Railways with his company's new South African subsidiary, Transport Vehicles (Atkinson) South Africa, Limited.

Duple Adopts Rawlings Windows

Rawlings Manufacturing Co., Limited, announces that its Paramount constant-balance full-drop window has been approved by Duple Motor Bodies, Limited, and is to be fitted as standard to many coaches based on Bedford and Commer as well as some heavier-type chassis. The Paramount window is notable for simple removal and replacement without disturbing panelling or seats.

Dollar Order for English Electric

The U.S. Army Corps of Engineers has placed an order for a second generator transformer for Table Rock power station, White River, Missouri, with English Electric Export and Trading Co., Limited. The order is worth about \$220,000. A further contract worth some 5,500,000 dollars has been placed with the company for two additional water-turbine generating sets for Priest Rapids, in the State of Washington. English Electric is already supplying eight turbines and generators and five transformers for this project.

North Eastern Region Contracts

Recent contracts placed by the North Eastern Region of British Railways include the following:

Colt Ventilation, Limited, Surbiton, for heating installation at York Railway Museum.

Steels Engineering Products, Limited, Manchester, for three 6-ton Coles diesel-electric mobile cranes.

Holman Bros., Limited, Sheffield, for Holman Tractair compressor.

The Butler Machine Tool Co., Limited, Halifax, for one axle-box slotting machine for Darlington locomotive works.

Hymatic Engineering Co., Limited, Redditch, for six Hymatic Hydrovane mobile compressors.

Consolidated Pneumatic Tool Co., Limited, Gateshead, for pneumatic tools, wrenches and other equipment.

I.T.D., Limited, London, for one fork-lift truck and ancillaries for Stockton goods depot.

Artic Fuse and Electrical Mfg. Co., Limited, Birtley, for one medium-voltage switchboard at York North motive power depot.

TENDERS INVITED

THE following items are extracted from the Board of Trade Special Register Service of Information. Inquiries should be addressed, quoting reference number where given, to the Export Services Branch, Board of Trade, Lacon House, Theobalds Road, London, W.C.1.

March 26.—Union of South Africa.—South African Railways for 16 trailable electric point machines and detectors and six crane handles for same. Tenders, endorsed "Tender No. C.2765: Electrical Signalling Material," to the Chief Stores Superintendent, P.O. Box 8617, Johannesburg. (ESB/5323/58.)

March 27.—India.—International Co-operation Administration for 22,500 tons 90-LB. F.B. RAILS, 20,000 tons 60-LB. F.B. RAILS and 35,000 tons 90-LB. F.B. RAILS. Tenders to the Government of India, India Supply Mission, 2536 Massachusetts Avenue N.W., Washington 8, D.C. (ESB/3483/58/ICA.)

March 28.—Union of South Africa.—South African Railways for large quantities of ELECTRICAL SIGNALLING MATERIALS. Photo copies of tender documents from Export Services Branch, B.O.T., price 21s. (ESB/5321/58.)

March 28.—Union of South Africa.—South African Railways for four 150-h.p. DIESEL CRAWLER TRACTORS, three ANGLEDOZERS and four TOOLBAR STRIPPERS. Tenders, endorsed "Tender No. F.7145: Crawler Tractors" to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. (ESB/4361/58.)

March 28.—Union of South Africa.—South African Railways for 115 or 208 light-type DIESEL-ELECTRIC or DIESEL-HYDRAULIC LOCOMOTIVES. Tender documents (£50 deposit) and set of drawings (£50) from the Chief Stores Superintendent, South African Railways, Room 207 Park Chambers, Rissik Street, Johannesburg, quoting Tender No. B.6695.

SHIPPING and SHIPBUILDING

Ore Handling in Indian Ports

INDIA may get another Rs.238,000,000 (about £18,000,000) in economic aid from the United States within the next few months for the development of Madras port, in addition to the Rs.1,071,000,000 in loans already offered. An Indian mission, led by Mr. B. K. Nehru, Secretary of Economic Affairs in the Finance Ministry, has been in Washington negotiating the terms of this latter offer. The scheme which America is prepared to help finance to the extent of \$50,000,000 is a joint Indo-Japanese project to develop the Port of Madras to handle Indian iron ore being shipped to Japan's steel mills. India, together with Japan, is also seeking a United States loan of Rs.190,000,000 for the development of Vishakapatnam port and railway facilities, again to help finance their joint project to develop rich iron ore deposits in Eastern India and improve certain railway and port facilities. The Indo-Japanese plan calls for the development of an iron ore mining site in the Rourkela district in Orissa.

Goole Suffers Recession

GRAVE reductions in trade at the port of Goole are shown in the figures of tonnages handled during February. Inward and outward cargoes totalled 181,910 tons compared with 291,565 tons in February last year. Shipments of coal, coke and patent fuel were 136,437 tons against 245,810 tons. Vessels arriving at the port numbered 203 of 82,672 tons net, compared with 350 ships with a tonnage of 131,501 in February last year.

Improvements at Heysham

TO accelerate the handling of growing British Railways container traffic between England and Northern Ireland, site work has begun at Heysham Harbour on the installation of two new full portal electric cranes on the North Quay. One crane will be of 12 tons capacity and the other 7½ tons. These and other improvements will operate in conjunction with two new container ships, one of which, the *Container Enterprise*, has already been launched.

Retractable Wheelhouse

SPECIALLY designed to carry German Esso products on inland waterways, the *Esso Mainz* of the standardised Gustav Koenigs type is powered by an M.W.M. oil engine of 750 h.p. An interesting feature of this 1,000-ton tanker is the wheelhouse which can be lowered hydraulically to facilitate passage under low bridges. The single piston hoist of this equipment combines an air-hydraulic control system with a retarder to prevent sudden descent. The vessel has an overall length of 220 ft. and a beam of 26 ft. 10 in. Six further tankers of this type are to be built within the next two years.

FINANCIAL RESULTS

NOTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations.

Associated Electrical Industries

A final dividend on the ordinary stock of 7½ per cent will be paid by Associated Electrical Industries, Limited, in respect of the financial year 1957. Net profit after tax was £4,594,075 (£4,459,713).

General Steam Navigation

The General Steam Navigation Co., Limited, will distribute 7½ per cent plus a bonus of 2½ per cent on ordinary for the year ended September 30, 1957. (7½ per cent, no bonus). Group net profit was £637,438 (£278,485) after tax; proportion due to parent £81,147 (£66,112).

Enfield Cables

Enfield Cables, Limited, has signed an agreement with the Federal Wire and Cable Division of the H. K. Porter Co. (Canada), Limited, whereby that organisation will market Enfield products in Canada. The agreement also provides for the sharing of technical know-how and experience should Federal Wire and Cable decide to embark on the manufacture of power cables in the future.

Leyland Motors

Saturation point appears to have been reached in the supply of new fleets of vehicles on the home market; any future increase of business must come from the smaller operator and the ancillary user. So says the annual statement by Sir Henry Spurrier, chairman of Leyland Motors, Limited, circulated with the accounts for year ended September 30, 1957. The whole future of the Leyland group, he goes on, depends largely on its ability to sell continuously more than half its output in the export markets. Profit for the year was £2,171,025 (£2,327,796). Ordinary stock dividend is 2s. 6d. per £1 unit (same).

B.T.C. TRAFFIC RECEIPTS: PERIOD NO. 2—1958

	Four Weeks to February 23, 1958			Aggregate for 8 Weeks		
	1958 (£ thousands)	1957	+ or -	1958 (£ thousands)	1957	+ or -
PASSENGERS						
British Railways ...	8,245	8,996	- 751	16,444	17,952	- 1,508
London Transport						
Railways ...	1,783	1,858	- 75	3,589	3,779	- 190
Road Services ...	4,405	4,589	- 184	8,731	9,221	- 490
Provincial and Scottish Buses ...	4,008	4,242	- 234	8,020	8,545	- 525
Ships ...	195	169	+ 26	447	396	+ 51
Total Passengers	18,636	19,854	- 1,218	37,231	39,893	- 2,662
FREIGHT, PARCELS AND MAILS						
British Railways						
Merchandise and livestock ...	7,876	9,480	- 1,604	15,208	18,919	- 3,711
Minerals ...	4,009	4,279	- 270	7,929	8,697	- 768
Coal and coke ...	11,216	11,247	- 31	21,822	22,008	- 186
Parcels, etc., by passenger train ...	3,927	3,836	+ 91	7,644	7,484	+ 160
Collection and delivery, etc. ...	949	1,093	- 144	1,883	2,143	- 260
Total Freight, British Railways ...	27,977	29,935	- 1,958	54,486	59,251	- 4,765
Others ...	4,179	4,233	- 54	8,125	8,177	- 52
Total Freight, Parcels and Mails ...	32,156	34,168	- 2,012	62,611	67,428	- 4,817
Aggregate ...	50,792	54,022	- 3,230	99,842	107,321	- 7,479

Comparisons are affected by increases in rates and charges which have been authorised from time to time, by the consequences of the restrictions on oil supplies from November 7, 1956, to May 14, 1957, and by the provincial bus strike from July 20 to 28, 1957.

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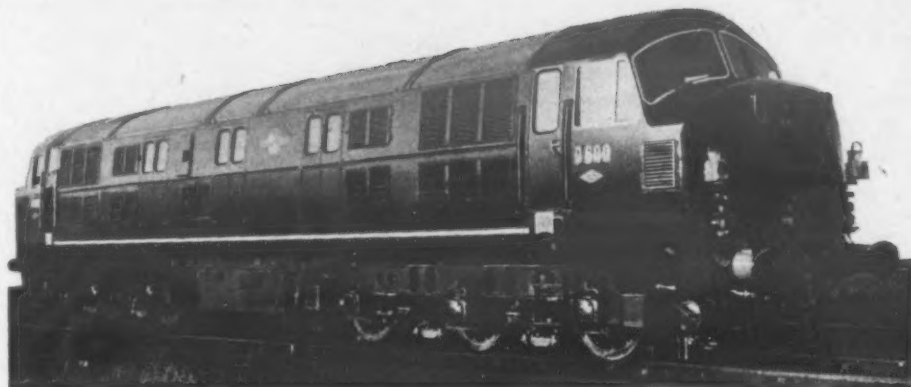
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British Railways

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Diesel Hydraulic

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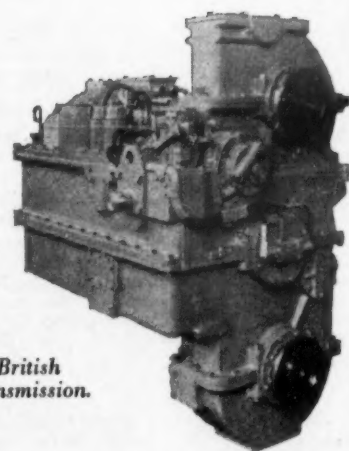


The locomotive shown above is the first of the Class 4 (2,000 B.H.P.) Diesel-Hydraulic locomotives delivered to British Railways under the Modernisation Plan. It was built by North British Locomotive Co. Ltd., at their works in Glasgow, for service in the Western Region.



NBL/MAN 1,100 B.H.P.
Diesel Engine. Type L12V 18/21 BS.

This Diesel Hydraulic system, which has been widely used abroad, has many advantages.



VOITH/North British
Hydraulic Transmission.
Type L306r.

In addition to these 2,000 B.H.P. locomotives, diesels on order from North British include 58 Diesel-Hydraulic type, of 1,000 B.H.P. and 48 Diesel Electric locomotives of 800 and 1,000 B.H.P.

NORTH BRITISH

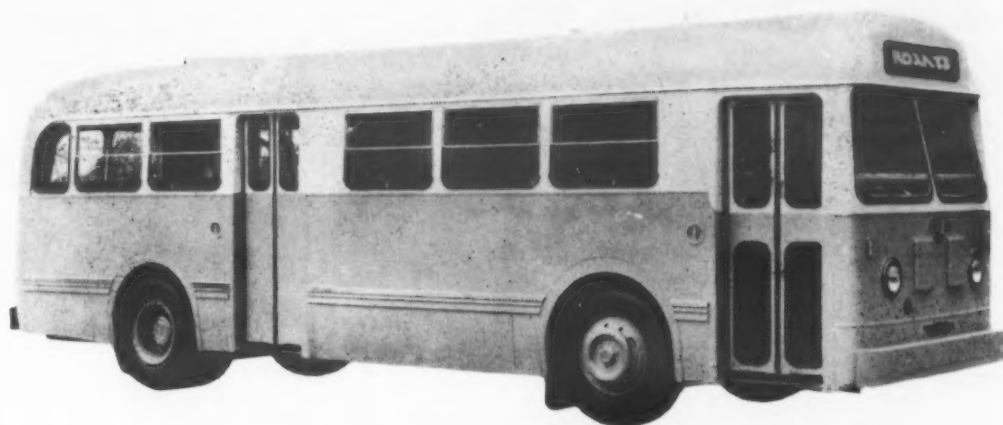
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for Royal Estates, Tehran



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They also have an order for fifty 31-seat luxury coach bodies on Leyland Comet ECO.2/4L special chassis for inter-city travel.



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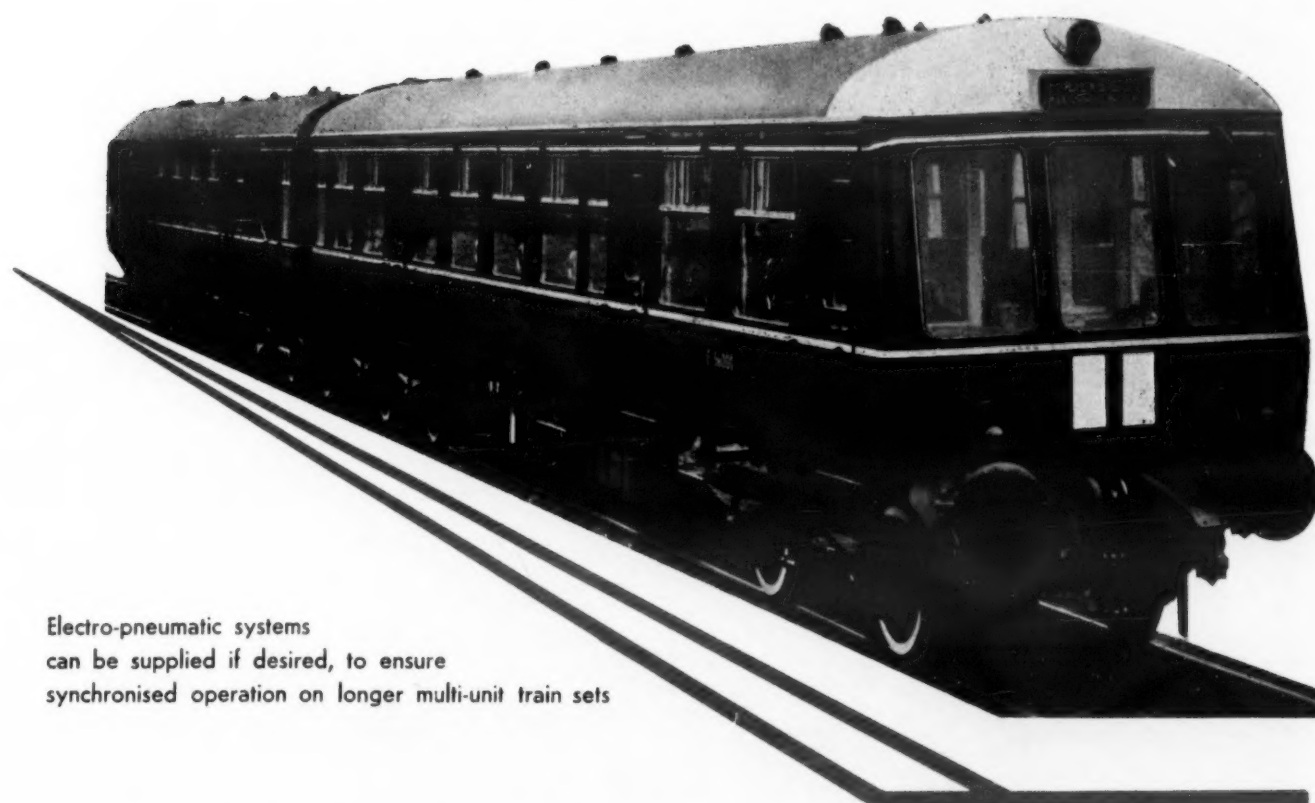
WESTINGHOUSE



PNEUMATIC CONTROL *for* RAILCARS

The illustration shows one of a number of Rolls-Royce engined Railcars for British Railways, which is fitted with Westinghouse Controls for the engines and transmissions.

This system of control includes a fully graduable throttle so that any desired engine setting can be obtained. Installations range from a single engine layout to one for use on a multi-engined train for operation of speed control, gear change, torque convertors, such as on the Rolls-Royce engined Railcar.



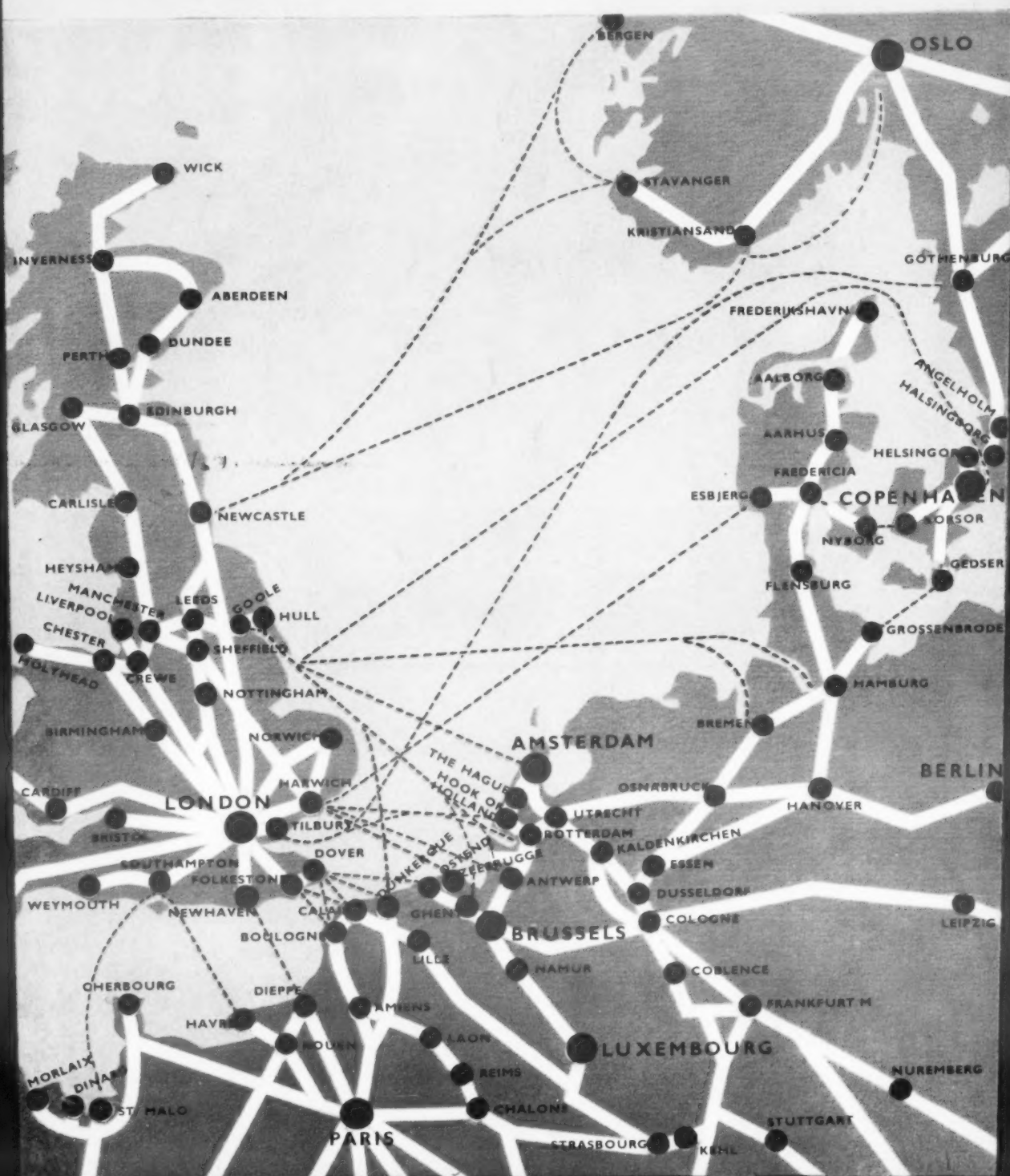
Electro-pneumatic systems can be supplied if desired, to ensure synchronised operation on longer multi-unit train sets

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